User's Manual

DPharp EJX™

EJX118A and EJX438A Diaphragm Sealed Differential Pressure and Pressure Transmitters

IM 01C25H01-01E

vigilantplant®

DPharp FOR THE DIGITAL WORLD

YOKOGAWA
Yokogawa Electric Corporation

IM 01C25H01-01E
6th Edition

EJX118A and EJX438A Diaphragm Sealed Differential Pressure and Pressure Transmitters

IM 01C25H01-01E 6th Edition

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Revision Information

When using the EJX in a Safety Instrumented Systems(SIS) application, refer to Appendix A in either IM 01C25T01-01E for the HART protocol or IM 01C25T03-01E for the BRAIN protocol.

1. Introduction

Thank you for purchasing the DPharp EJX Differential Pressure and pressure transmitter.

Your EJX Pressure Transmitter was precisely calibrated at the factory before shipment. To ensure both safety and efficiency, please read this manual carefully before you operate the instrument.

NOTE

This manual describes the hardware configurations of EJX series transmitters. For information on the software configuration and operation, please refer to either IM 01C25T03-01E for the EJX series BRAIN communication type or IM 01C25T01-01E for the EJX series HART communication type.

For FOUNDATION Fieldbus protocol type, please refer to IM 01C25T02-01E.

To ensure correct use of this instrument, read both the hardware and software manuals thoroughly before use.

WARNING

When using the EJX in a Safety Instrumented Systems (SIS) application, refer to Appendix A in either IM 01C25T01-01E for the HART protocol or IM 01C25T03-01E for the BRAIN protocol. The instructions and procedures in this section must be strictly followed in order to maintain the transmitter for this safety level.

NOTE

This manual covers the EJX118A diaphragm sealed differential pressure transmitter and EJX438A diaphragm sealed gauge pressure transmitter whose style codes are described in the following table.
Unless otherwise stated, the illustrations in this manual are of the EJX118A diaphragm sealed differential pressure transmitter.
Users of the EJX438A should bear in mind that certain features of their instrument will differ from those shown in the illustrations of the EJX118A.

Model	Style code
EJX118A	S2
EJX438A	S2

■ Regarding This Manual

- This manual should be provided to the end user.
- The contents of this manual are subject to change without prior notice.
- All rights reserved. No part of this manual may be reproduced in any form without Yokogawa's written permission.
- Yokogawa makes no warranty of any kind with regard to this manual, including, but not limited to, implied warranty of merchantability and fitness for a particular purpose.
- If any question arises or errors are found, or if any information is missing from this manual, please inform the nearest Yokogawa sales office.
- The specifications covered by this manual are limited to those for the standard type under the specified model number break-down and do not cover custom-made instruments.
- Please note that changes in the specifications, construction, or component parts of the instrument may not immediately be reflected in this manual at the time of change, provided that postponement of revisions will not cause difficulty to the user from a functional or performance standpoint.
- Yokogawa assumes no responsibilities for this product except as stated in the warranty.
- If the customer or any third party is harmed by the use of this product, Yokogawa assumes no responsibility for any such harm owing to any defects in the product which were not predictable, or for any indirect damages.
- The following safety symbols are used in this manual:

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

IMPORTANT

Indicates that operating the hardware or software in this manner may damage it or lead to system failure.

NOTE

Draws attention to information essential for understanding the operation and features.

⎓ Direct current

1.1 Safe Use of This Product

For the safety of the operator and to protect the instrument and the system, please be sure to follow this manual's safety instructions when handling this instrument. If these instructions are not heeded, the protection provided by this instrument may be impaired. In this case, Yokogawa cannot guarantee that the instrument can be safely operated. Please pay special attention to the following points:

(a) Installation

- This instrument may only be installed by an engineer or technician who has an expert knowledge of this device. Operators are not allowed to carry out installation unless they meet this condition.
- With high process temperatures, care must be taken not to burn yourself by touching the instrument or its casing.
- Never loosen the process connector nuts when the instrument is installed in a process. This can lead to a sudden, explosive release of process fluids.
- When draining condensate from the pressure detector section, take appropriate precautions to prevent the inhalation of harmful vapors and the contact of toxic process fluids with the skin or eyes.
- When removing the instrument from a hazardous process, avoid contact with the fluid and the interior of the meter.
- All installation shall comply with local installation requirements and the local electrical code.

(b) Wiring

- The instrument must be installed by an engineer or technician who has an expert knowledge of this instrument. Operators are not permitted to carry out wiring unless they meet this condition.
- Before connecting the power cables, please confirm that there is no current flowing through the cables and that the power supply to the instrument is switched off.

(c) Operation

- Wait 5 min. after the power is turned off, before opening the covers.

(d) Maintenance

- Please carry out only the maintenance procedures described in this manual. If you require further assistance, please contact the nearest Yokogawa office.
- Care should be taken to prevent the build up of dust or other materials on the display glass and the name plate. To clean these surfaces, use a soft, dry cloth.

(e) Explosion Protected Type Instrument

- Users of explosion proof instruments should refer first to section 2.9 (Installation of an Explosion Protected Instrument) of this manual.
- The use of this instrument is restricted to those who have received appropriate training in the device.
- Take care not to create sparks when accessing the instrument or peripheral devices in a hazardous location.

(f) Modification

- Yokogawa will not be liable for malfunctions or damage resulting from any modification made to this instrument by the customer.

1.2 Warranty

- The warranty shall cover the period noted on the quotation presented to the purchaser at the time of purchase. Problems occurring during the warranty period shall basically be repaired free of charge.
- If any problems are experienced with this instrument, the customer should contact the Yokogawa representative from which this instrument was purchased or the nearest Yokogawa office.
- If a problem arises with this instrument, please inform us of the nature of the problem and the circumstances under which it developed, including the model specification and serial number. Any diagrams, data and other information you can include in your communication will also be helpful.
- The party responsible for the cost of fixing the problem shall be determined by Yokogawa following an investigation conducted by Yokogawa.
- The purchaser shall bear the responsibility for repair costs, even during the warranty period, if the malfunction is due to:

  - Improper and/or inadequate maintenance by the purchaser.
  - Malfunction or damage due to a failure to handle, use, or store the instrument in accordance with the design specifications.
  - Use of the product in question in a location not conforming to the standards specified by Yokogawa, or due to improper maintenance of the installation location.
  - Failure or damage due to modification or repair by any party except Yokogawa or an approved representative of Yokogawa.
  - Malfunction or damage from improper relocation of the product in question after delivery.
  - Reason of force majeure such as fires, earthquakes, storms/floods, thunder/ lightening, or other natural disasters, or disturbances, riots, warfare, or radioactive contamination.

1.3 ATEX Documentation

This is only applicable to the countries in European Union.

GB
All instruction manuals for ATEX Ex related products are available in English, German and French. Should you require Ex related instructions in your local language, you are to contact your nearest Yokogawa office or representative.

DK
Alle brugervejledninger for produkter relateret til ATEX Ex er tilgængelige på engelsk, tysk og fransk. Skulle De ønske yderligere oplysninger om håndtering af Ex produkter på eget sprog, kan De rette henvendelse herom til den nærmeste Yokogawa afdeling eller forhandler.

I
Tutti i manuali operativi di prodotti ATEX contrassegnati con Ex sono disponibili in inglese, tedesco e francese. Se si desidera ricevere i manuali operativi di prodotti Ex in lingua locale, mettersi in contatto con l'ufficio Yokogawa più vicino o con un rappresentante.

E
Todos los manuales de instrucciones para los productos antiexplosivos de ATEX están disponibles en inglés, alemán y francés. Si desea solicitar las instrucciones de estos artículos antiexplosivos en su idioma local, deberá ponerse en contacto con la oficina o el representante de Yokogawa más cercano.

NL
Alle handleidingen voor producten die te maken hebben met ATEX explosiebeveiliging (Ex) zijn verkrijgbaar in het Engels, Duits en Frans. Neem, indien u aanwijzingen op het gebied van explosiebeveiliging nodig hebt in uw eigen taal, contact op met de dichtstbijzijnde vestiging van Yokogawa of met een vertegenwoordiger.

SF
Kaikkien ATEX Ex -tyyppisten tuotteiden käyttöhjeet ovat saatavilla englannin-, saksan- ja ranskankielisinä. Mikäli tarvitsette Ex -tyyppisten tuotteiden ohjeita omalla paikallisella kielellännne, ottakaa yhteyttä lähimpään Yokogawa-toimistoon tai -edustajaan.

P
Todos os manuais de instruções referentes aos produtos Ex da ATEX estão disponíveis em Inglês, Alemão e Francês. Se necessitar de instruções na sua língua relacionadas com produtos Ex, deverá entrar em contacto com a delegação mais próxima ou com um representante da Yokogawa.

F
Tous les manuels d'instruction des produits ATEX Ex sont disponibles en langue anglaise, allemande et française. Si vous nécessitez des instructions relatives aux produits Ex dans votre langue, veuillez bien contacter votre représentant Yokogawa le plus proche.

D
Alle Betriebsanleitungen für ATEX Ex bezogene Produkte stehen in den Sprachen Englisch, Deutsch und Französisch zur Verfügung. Sollten Sie die Betriebsanleitungen für Ex-Produkte in Ihrer Landessprache benötigen, setzen Sie sich bitte mit Ihrem örtlichen Yokogawa-Vertreter in Verbindung.

S
Alla instruktionsböcker för ATEX Ex (explosionssäkra) produkter är tillgängliga på engelska, tyska och franska. Om Ni behöver instruktioner för dessa explosionssäkra produkter på annat språk, skall Ni kontakta närmaste Yokogawakontor eller representant.

GR
Όλα τα εγχειρίδια λειτουργίας των προϊόντων με ATEX Ex διατίθενται στα Αγγλικά, Γερμανικά και Γαλλικά. Σε περίπτωση που χρειάζεστε οδηγίες σχετικά με Ex στην τοπική γλώσσα παρακαλούμε επικοινωνήστε με το πλησιέστερο γραφείο της Yokogawa ή αντιπρόσωπο της.

SK
Všetky návody na obsluhu pre prístroje s ATEX Ex sú k dispozícii v jazyku anglickom, nemeckom a francúzskom. V prípade potreby návodu pre Ex-prístroje vo Vašom národnom jazyku, skontaktujte prosím miestnu kanceláriu firmy Yokogawa.

CZ
Všechny uživatelské příručky pro výrobky, na něž se vztahuje nevýbušné schválení ATEX Ex, jsou dostupné v angličtině, němčině a francouzštině. Požadujete-li pokyny týkající se výrobků s nevýbušným schválením ve vašem lokálním jazyku, kontaktujte prosím vaši nejbližší reprezentační kancelář Yokogawa.

LT
Visos gaminiø ATEX Ex kategorijos Eksploatavimo instrukcijos teikiami anglø, vokieèiø ir prancûzø kalbomis. Norëdami gauti prietaisø Ex dokumentacijà kitomis kalbomis susisiekite su artimiausiu bendrovës "Yokogawa" biuru arba atstovu.

LV
Visas ATEX Ex kategorijas izstrâdâjumu Lietoðanas instrukcijas tiek piegâdâtas angïu, vâcu un franèu valodâs. Ja vçlaties saòemt Ex ierîèu dokumentâciju citâ valodâ, Jums ir jâsazinâs ar firmas Jokogava (Yokogawa) tuvâko ofisu vai pârstâvi.

EST
Kõik ATEX Ex toodete kasutamisjuhendid on esitatud inglise, saksa ja prantsuse keeles. Ex seadmete muukeelse dokumentatsiooni saamiseks pöörduge lähima lokagava (Yokogawa) kontori või esindaja poole.

PL
Wszystkie instrukcje obsługi dla urządzeń w wykonaniu przeciwwybuchowym Ex, zgodnych z wymaganiami ATEX, dostępne są w języku angielskim, niemieckim i francuskim. Jeżeli wymagana jest instrukcja. obsługi w Państwa lokalnym ję zyku, prosimy o kontakt z najbliższym biurem Yokogawy.

SLO
Vsi predpisi in navodila za ATEX Ex sorodni pridelki so pri roki v angliščini, nemščini ter francoščini. Če so Ex sorodna navodila potrebna v vašem tukejnjem jeziku, kontaktirajte vaš najbliši Yokogawa office ili predstaunika.

H
Az ATEX Ex mûszerek gépkönyveit angol, német és francia nyelven adjuk ki. Amennyiben helyi nyelven kérik az Ex eszközök leírásait, kérjük keressék fel a legközelebbi Yokogawa irodát, vagy képviseletet.

BG
Всички упътвания за продукти от серията ATEX Ex се предлагат на английски, немски и френски език. Ако се нуждаете от упътвания за продукти от серията Ex на родния ви език, се свържете с най-близкия офис или представителство на фирма Yokogawa.

RO
Toate manualele de instructiuni pentru produsele ATEX Ex sunt in limba engleza, germana si franceza. In cazul in care doriti instructiunile in limba locala, trebuie sa contactati cel mai apropiat birou sau reprezentant Yokogawa.

M
Il-manwali kollha ta' l-istruzzjonijiet għal prodotti marbuta ma' ATEX Ex huma disponibbli bl-Ingliż, bil-Ġermaniż u bil-Franċiż. Jekk tkun teħtieġ struzzjonijiet marbuta ma' Ex fil-lingwa lokali tiegħek, għandek tikkuntattja lill-eqreb rappreżentan jew uffiċċju ta' Yokogawa.

2. Handling Cautions

This chapter provides important information on how to handle the transmitter. Read this carefully before using the transmitter.

EJX Series transmitters are thoroughly tested at the factory before shipment. When taking delivery of an instrument, visually check them to make sure that no damage occurred during shipment.

Also check that all transmitter mounting hardware shown in figure 2.1 is included. If the transmitter is ordered without the mounting bracket, the transmitter mounting hardware will not be included. After checking the transmitter, carefully repack it in its box and keep it there until you are ready to install it.

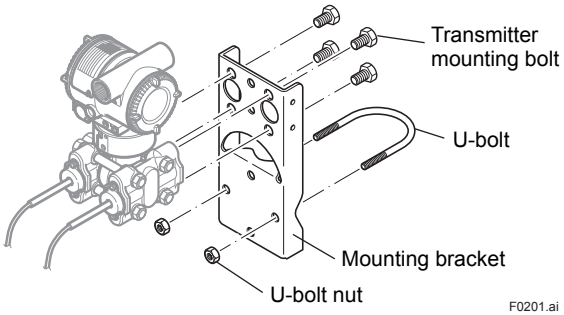


Figure 2.1 Transmitter Mounting Hardware

2.1 Model and Specifications Check

The model name and specifications are written on the name plate attached to the case.

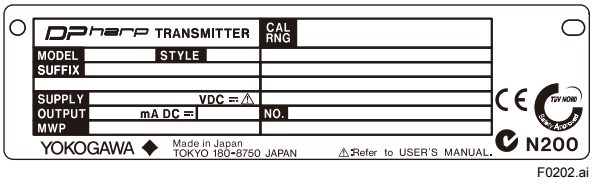


Figure 2.2 Name Plate

2.2 Unpacking

Keep the transmitter in its original packaging to prevent it from being damaged during shipment. Do not unpack the transmitter until it reaches the installation site.

2.3 Storage

The following precautions must be observed when storing the instrument, especially for a long period.

(a) Select a storage area which meets the following conditions:
- It is not exposed to rain or subject to water seepage/leaks.
- Vibration and shock are kept to a minimum.
- It has an ambient temperature and relative humidity within the following ranges.

Ambient temperature:
–40* to 85°C without integral indicator
–30* to 80°C with integral indicator
* –15°C when /HE is specified.
Relative humidity:
0% to 100% R.H. (at 40°C)
Preferred temperature and humidity:
approx. 25°C and 65% R.H.

(b) When storing the transmitter, repack it carefully in the packaging that it was originally shipped with.

(c) If the transmitter has been used, thoroughly clean the diaphragm surface of the diaphragm seal (pressure-detector section), so that there is no process fluid remaining on them. Before placing it in storage, also make sure that the pressure-detector is securely connected to the transmitter section.

2.4 Selecting the Installation Location

The transmitter is designed to withstand severe environmental conditions. However, to ensure that it will provide years of stable and accurate performance, take the following precautions when selecting the installation location.

(a) Ambient Temperature
Avoid locations subject to wide temperature variations or a significant temperature gradient. If the location is exposed to radiant heat from plant equipment, provide adequate thermal insulation and/or ventilation.

(b) Ambient Atmosphere
Do not install the transmitter in a corrosive atmosphere. If this cannot be avoided, there must be adequate ventilation as well as measures to prevent the leaking of rain water and the presence of standing water in the conduits.

(c) Shock and Vibration
Although the transmitter is designed to be relatively resistant to shock and vibration, an installation site should be selected where this is kept to a minimum.

(d) Installation of Explosion-protected Transmitters
An explosion-protected transmitters is certified for installation in a hazardous area containing specific gas types. See subsection 2.9 “Installation of an Explosion-Protected Transmitters.”

2.5 Pressure Connection

CAUTION

- Never loosen the process flange bolts when an instrument is installed in a process. The device is under pressure, and a loss of seal can result in a sudden and uncontrolled release of process fluid.
- Since the accumulated process fluid may be toxic or otherwise harmful, take appropriate steps to prevent the contact of such fluids with the skin or eyes and the inhalation of vapors from these fluids even after dismounting the instrument from process line for maintenance.

The following precautions must be observed in order to safely operate the transmitter under pressure.

(a) Make sure that there are no leaks in the impulse piping.
(b) Never apply a pressure higher than the specified maximum working pressure.

2.6 Waterproofing of Cable Conduit Connections

Apply a non-hardening sealant to the threads to waterproof the transmitter cable conduit connections. (See figure 5.8, 5.9 and 5.10.)

2.7 Restrictions on Use of Radio Transceivers

IMPORTANT

Although the transmitter has been designed to resist high frequency electrical noise, if a radio transceiver is used near the transmitter or its external wiring, the transmitter may be affected by high frequency noise pickup. To test this, start out from a distance of several meters and slowly approach the transmitter with the transceiver while observing the measurement loop for noise effects. Thereafter use the transceiver outside the range where the noise effects were first observed.

2.8 Insulation Resistance and Dielectric Strength Test

Since the transmitter has undergone insulation resistance and dielectric strength tests at the factory before shipment, normally these tests are not required. If the need arises to conduct these tests, heed the following:

(a) Do not perform such tests more frequently than is absolutely necessary. Even test voltages that do not cause visible damage to the insulation may degrade the insulation and reduce safety margins.

(b) Never apply a voltage exceeding 500 V DC (100 V DC with an internal lightning protector) for the insulation resistance test, nor a voltage exceeding 500 V AC (100 V AC with an internal lightning protector) for the dielectric strength test.
(c) Before conducting these tests, disconnect all signal lines from the transmitter terminals. The procedure for conducting these tests is as follows:

• Insulation Resistance Test

1) Short-circuit the + and – SUPPLY terminals in the terminal box.
2) Turn OFF the insulation tester. Then connect the insulation tester plus (+) lead wire to the shorted SUPPLY terminals and the minus (–) leadwire to the grounding terminal.
3) Turn ON the insulation tester power and measure the insulation resistance. The voltage should be applied as briefly as possible to verify that the insulation resistance is at least 20 MΩ.
4) After completing the test and being very careful not to touch exposed conductors disconnect the insulation tester and connect a 100 kΩ resistor between the grounding terminal and the short-circuiting SUPPLY terminals. Leave this resistor connected at least one second to discharge any static potential. Do not touch the terminals while it is discharging.

• Dielectric Strength Test

1) Short-circuit the + and – SUPPLY terminals in the terminal box.
2) Turn OFF the dielectric strength tester. Then connect the tester between the shorted SUPPLY terminals and the grounding terminal. Be sure to connect the grounding lead of the dielectric strength tester to the ground terminal.
3) Set the current limit on the dielectric strength tester to 10 mA, then turn ON the power and gradually increase the test voltage from '0' to the specified voltage.
4) When the specified voltage is reached, hold it for one minute.
5) After completing this test, slowly decrease the voltage to avoid any voltage surges.

2.9 Installation of an Explosion-Protected Instrument

NOTE

For FOUNDATION Fieldbus explosion protected type, please refer to IM 01C22T02-01E.

If a customer makes a repair or modification to an intrinsically safe or explosionproof instrument and the instrument is not restored to its original condition, its intrinsically safe or explosionproof construction may be compromised and the instrument may be hazardous to operate. Please contact Yokogawa before making any repair or modification to an instrument.

CAUTION

This instrument has been tested and certified as being intrinsically safe or explosionproof. Please note that severe restrictions apply to this instrument's construction, installation, external wiring, maintenance and repair. A failure to abide by these restrictions could make the instrument a hazard to operate.

WARNING

Maintaining the safety of explosionproof equipment requires great care during mounting, wiring, and piping. Safety requirements also place restrictions on maintenance and repair. Please read the following sections very carefully.

WARNING

The range setting switch must not be used in a hazardous area.

2.9.1 FM Approval

a. FM Intrinsically Safe Type

Caution for FM intrinsically safe type. (Following contents refer “DOC. No. IFM022-A12”)

Note 1. Model EJX Series Differential, gauge and absolute pressure transmitters with optional code /FS1 are applicable for use in hazardous locations.

- Applicable Standard: FM3600, FM3610, FM3611, FM3810
- Intrinsically Safe for Class I, Division 1, Groups A, B, C & D. Class II, Division 1, Groups E, F & G and Class III, Division 1, Class I, Zone 0 in Hazardous Locations, AEx ia IIC
- Nonincendive for Class I, Division 2, Groups A, B, C & D. Class II, Division 2, Groups F & G and Class III, Division 1, Class I, Zone 2, Groups IIC, in Hazardous Locations.
- Outdoor hazardous locations, NEMA 4X.
- Temperature Class: T4
- Ambient temperature: –60* to 60°C
  * –15°C when /HE is specified.

Note 2. Entity Parameters

- Intrinsically Safe Apparatus Parameters
  [Groups A, B, C, D, E, F and G]
  Vmax = 30 V Ci = 6 nF
  Imax = 200 mA Li = 0 µH
  Pmax = 1 W

* Associated Apparatus Parameters
(FM approved barriers)
Voc ≤ 30 V Ca > 6 nF
Isc ≤ 200 mA La > 0 µH
Pmax ≤ 1W

- Intrinsically Safe Apparatus Parameters
  [Groups C, D, E, F and G]
  Vmax = 30 V Ci = 6 nF
  Imax = 225 mA Li = 0 µH
  Pmax = 1 W

* Associated Apparatus Parameters
(FM approved barriers)
Voc ≤ 30 V Ca > 6 nF
Isc ≤ 225 mA La > 0 µH
Pmax ≤ 1 W

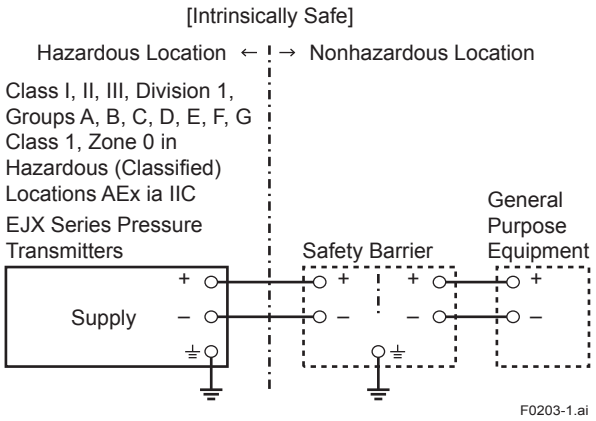
- Entity Installation Requirements
  Vmax ≥ Voc or Uo or Vt, Imax ≥ Isc or Io or It,
  Pmax (or Po) ≤ Pi, Ca or Co ≥ Ci + Ccable,
  La or Lo ≥ Li + Lcable

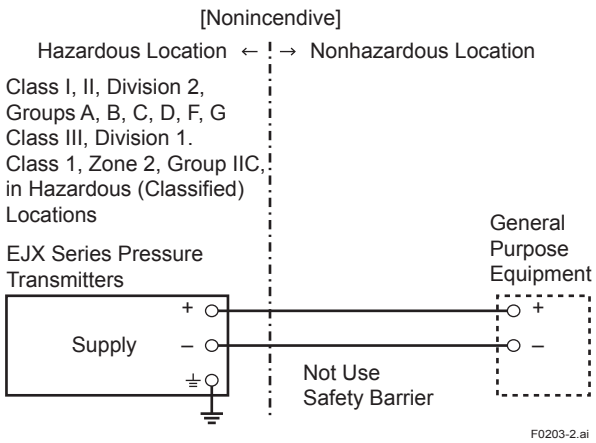
Note 3. Installation

- Barrier must be installed in an enclosure that meets the requirements of ANSI/ISA S82.01.
- Control equipment connected to barrier must not use or generate more than 250 V rms or V dc.
- Installation should be in accordance with ANSI/ISA RP12.6 “Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations” and the National Electric Code (ANSI/NFPA 70).
- The configuration of associated apparatus must be FMRC Approved.
- Dust-tight conduit seal must be used when installed in a Class II, III, Group E, F and G environments.
- Associated apparatus manufacturer’s installation drawing must be followed when installing this apparatus.
- The maximum power delivered from the barrier must not exceed 1 W.
- Note a warning label worded “SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY,” and “INSTALL IN ACCORDANCE WITH DOC. No. IFM022-A12”

Note 4. Maintenance and Repair

- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void Factory Mutual Intrinsically safe and Nonincendive Approval.


[Intrinsically Safe]
Hazardous Location
Nonhazardous Location
Class I, II, III, Division 1, Groups A, B, C, D, E, F, G Class 1, Zone 0 in Hazardous (Classified) Locations AEx ia IIC
EJX Series Pressure Transmitters
Safety Barrier
General Purpose Equipment
Supply
+
–
F0203-1.ai



b. FM Explosionproof Type

Caution for FM explosionproof type.

Note 1. Model EJX Series pressure transmitters with optional code /FF1 are applicable for use in hazardous locations.

- Applicable Standard: FM3600, FM3615, FM3810, ANSI/NEMA 250
- Explosionproof for Class I, Division 1, Groups B, C and D.
- Dust-ignitionproof for Class II/III, Division 1, Groups E, F and G.
- Enclosure rating: NEMA 4X.
- Temperature Class: T6
- Ambient Temperature: –40* to 60°C
  * –15°C when /HE is specified.
- Supply Voltage: 42 V dc max.
- Output signal: 4 to 20 mA

Note 2. Wiring

- All wiring shall comply with National Electrical Code ANSI/NFPA70 and Local Electrical Codes.
- When installed in Division 1, “FACTORY SEALED, CONDUIT SEAL NOT REQUIRED.”

Note 3. Operation

- Keep the “WARNING” nameplate attached to the transmitter.
  WARNING: OPEN CIRCUIT BEFORE REMOVING COVER. FACTORY SEALED, CONDUIT SEAL NOT REQUIRED. INSTALL IN ACCORDANCE WITH THE USERS MANUAL IM 01C25.
- Take care not to generate mechanical sparking when accessing to the instrument and peripheral devices in a hazardous location.

Note 4. Maintenance and Repair

- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void Factory Mutual Explosionproof Approval.

c. FM Intrinsically Safe Type/FM Explosionproof Type

Model EJX Series pressure transmitters with optional code /FU1 or /V1U can be selected the type of protection (FM Intrinsically Safe or FM Explosionproof) for use in hazardous locations.

Note 1. For the installation of this transmitter, once a particular type of protection is selected, any other type of protection cannot be used. The installation must be in accordance with the description about the type of protection in this instruction manual.

Note 2. In order to avoid confusion, unnecessary marking is crossed out on the label other than the selected type of protection when the transmitter is installed.

2.9.2 CSA Certification

a. CSA Intrinsically Safe Type

Caution for CSA Intrinsically safe and nonincendive type. (Following contents refer to “DOC No. ICS013-A13”)

Note 1. Model EJX Series differential, gauge, and absolute pressure transmitters with optional code /CS1 are applicable for use in hazardous locations

Certificate: 1606623

[For CSA C22.2]

- Applicable Standard: C22.2 No.0, C22.2 No.0.4, C22.2 No.25, C22.2 No.94, C22.2 No.157, C22.2 No.213, C22.2 No.1010.1
- Intrinsically Safe for Class I, Division 1, Groups A, B, C & D, Class II, Division 1, Groups E, F & G, Class III, Division 1
- Nonincendive for Class I, Division 2, Groups A, B, C & D, Class II, Division 2, Groups E, F & G, Class III, Division 1
- Enclosure: Type 4X
- Temp. Code: T4
- Amb. Temp.: –50* to 60°C
  * –15°C when /HE is specified.
- Process Temperature: 120°C max.

[For CSA E60079]

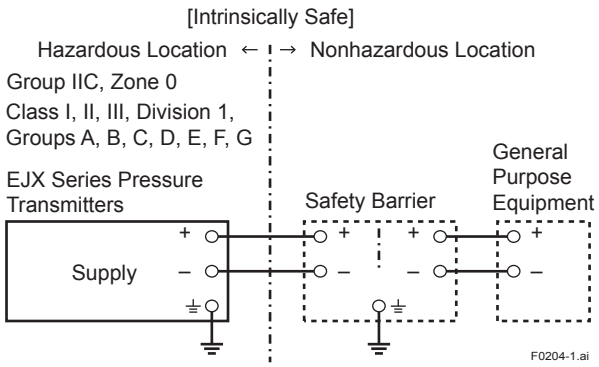
- Applicable Standard: CAN/CSA E60079-0, CAN/CSA E60079-11, CAN/CSA E60079-15, IEC 60529:2001-02
- Ex ia IIC T4, Ex nL IIC T4
- Ambient Temperature: –50* to 60°C
  * –15°C when /HE is specified.
- Max. Process Temp.: 120°C
- Enclosure: IP66 and IP67

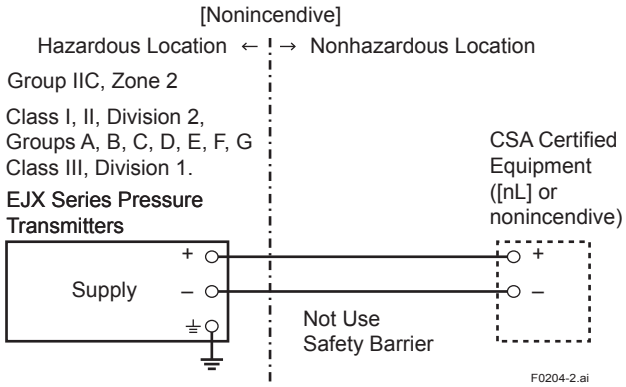
Note 2. Entity Parameters

- Intrinsically safe ratings are as follows:
  Maximum Input Voltage (Vmax/Ui) = 30 V
  Maximum Input Current (Imax/Ii) = 200 mA
  Maximum Input Power (Pmax/Pi) = 0.9 W
  Maximum Internal Capacitance (Ci) = 10 nF
  Maximum Internal Inductance (Li) = 0 µH
- Type "n" or Nonincendive ratings are as follows:
  Maximum Input Voltage (Vmax/Ui) = 30 V
  Maximum Internal Capacitance (Ci) = 10 nF
  Maximum Internal Inductance (Li) = 0 µH
- Installation Requirements
  Uo ≤ Ui, Io ≤ Ii, Po ≤ Pi,
  Co ≥ Ci + Ccable, Lo ≥ Li + Lcable
  Voc ≤ Vmax, Isc ≤ Imax,
  Ca ≥ Ci + Ccable, La ≥ Li + Lcable
  Uo, Io, Po, Co, Lo, Voc, Isc, Ca and La are parameters of barrier.

Note 3. Installation

- In any safety barreir used output current must be limited by a resistor 'R' such that Io=Uo/R or Isc=Voc/R.
- The safety barrier must be CSA certified.
- Input voltage of the safety barrier must be less than 250 Vrms/Vdc.
- Installation should be in accordance with Canadian Electrical Code Part I and Local Electrical Code.
- Dust-tight conduit seal must be used when installed in Class II and III environments.
- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation and Yokogawa Corporation of America is prohibited and will void Canadian Standards Intrinsically safe and nonincendive Certification.





b. CSA Explosionproof Type

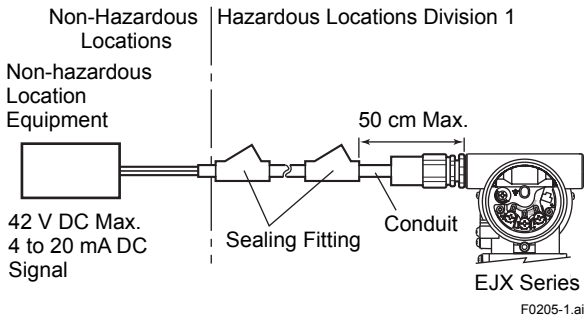
Caution for CSA explosionproof type.

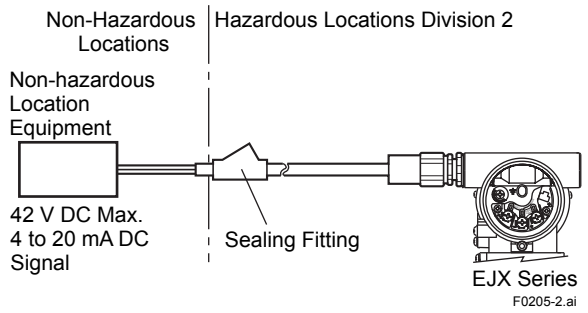
Note 1. Model EJX Series pressure transmitters with optional code /CF1 are applicable for use in hazardous locations:

- Certificate: 2014354
- Applicable Standard: C22.2 No.0, C22.2 No.0.4, C22.2 No.0.5, C22.2 No.25, C22.2 No.30, C22.2 No.94, C22.2 No.61010-1-04, C22.2 No.60079-0, C22.2 No.60079-1
- Explosion-proof for Class I, Groups B, C and D.
- Dustignition-proof for Class II/III, Groups E, F and G.
- Enclosure: TYPE 4X
- Temperature Code: T6...T4
- Ex d IIC T6...T4
- Enclosure: IP66 and IP67
- Maximum Process Temperature: 120°C (T4), 100°C (T5), 85°C (T6)
- Ambient Temperature: –50* to 75°C (T4), –50* to 80°C (T5), –50* to 75°C (T6)
  * –15°C when /HE is specified.
- Supply Voltage: 42 V dc max.
- Output Signal: 4 to 20 mA dc

Note 2. Wiring

- All wiring shall comply with Canadian Electrical Code Part I and Local Electrical Codes.
- In hazardous location, wiring shall be in conduit as shown in the figure.
- WARNING:
  A SEAL SHALL BE INSTALLED WITHIN 50cm OF THE ENCLOSURE.
  UN SCELLEMENT DOIT ÊTRE INSTALLÉ À MOINS DE 50cm DU BOÎTIER.
- WARNING:
  WHEN INSTALLED IN CL.I, DIV 2, SEAL NOT REQUIRED.
  UNE FOIS INSTALLÉ DANS CL I, DIV 2, AUCUN JOINT N'EST REQUIS.





- All wiring shall comply with local installation requirements and local electrical code.
- In hazardous locations, the cable entry devices shall be of a certified flameproof type, suitable for the conditions of use and correctly installed.
- Unused apertures shall be closed with suitable flameproof certified blanking elements. (The plug attached is flameproof certified.)

Note 3. Operation

- WARNING:
  AFTER DE-ENERGIZING, DELAY 5 MINUTES BEFORE OPENING.
  APRÉS POWER-OFF, ATTENDRE 5 MINUTES AVANT D'OUVRIR.
- WARNING:
  WHEN AMBIENT TEMPERATURE ≥ 65°C, USE THE HEAT-RESISTING CABLES ≥ 90°C.
  QUAND LA TEMPÉRATURE AMBIANTE ≥ 65°C, UTILISEZ DES CÂBLES RÉSISTANTES Á LA CHALEUR ≥ 90°C.
- Take care not to generate mechanical sparking when accessing to the instrument and peripheral devices in a hazardous location.

Note 4. Maintenance and Repair

- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation and Yokogawa Corporation of America is prohibited and will void Canadian Standards Explosionproof Certification.

c CSA Intrinsically Safe Type/CSA Explosionproof Type

Model EJX Series pressure transmitters with optional code /CU1 or /V1U can be selected the type of protection (CSA Intrinsically Safe or CSA Explosionproof) for use in hazardous locations.

Note 1. For the installation of this transmitter, once a particular type of protection is selected, any other type of protection cannot be used. The installation must be in accordance with the description about the type of protection in this instruction manual.

Note 2. In order to avoid confusion, unnecessary marking is crossed out on the label other than the selected type of protection when the transmitter is installed.

2.9.3 CENELEC ATEX (KEMA) Certification

(1) Technical Data

a. CENELEC ATEX (KEMA) Intrinsically Safe Type

Caution for CENELEC ATEX (KEMA) Intrinsically safe type.

Note 1. Model EJX Series pressure transmitters with optional code /KS2 for potentially explosive atmospheres:

- No. KEMA 03ATEX1544 X

- Applicable Standard:
  EN 50014:1997, EN 50020:2002,
  EN 50284:1999, EN 50281-1-1:1998
- Type of Protection and Marking code:
  EEx ia IIC T4
- Group: II
- Category: 1GD
- Ambient Temperature for gas-proof:
  –50* to 60°C
- Process Temperature (Tp.): 120°C max.
- Maximum Surface Temperature for dust-proof:
  T85°C (Tamb.: –40* to 60°C, Tp.: 80°C)
  T100°C (Tamb.: –40* to 60°C, Tp.: 100°C)
  T120°C (Tamb.: –40* to 60°C, Tp.: 120°C)
  * –15°C when /HE is specified.
- Enclosure: IP66 and IP67

Note 2. Electrical Data

- In type of explosion protection intrinsic safety EEx ia IIC only for connection to a certified intrinsically safe circuit with following maximum values:
  Ui = 30 V
  Ii = 200 mA
  Pi = 0.9 W
  Effective internal capacitance; Ci = 10 nF
  Effective internal inductance; Li = 0 mH

Note 3. Installation

- All wiring shall comply with local installation requirements. (Refer to the installation diagram)

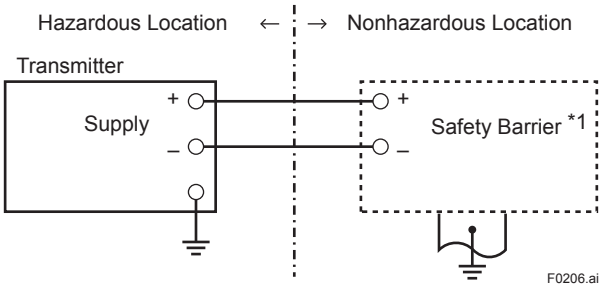
Note 4. Maintenance and Repair

- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void KEMA Intrinsically safe Certification.

Note 5. Special Conditions for Safe Use

- In the case where the enclosure of the Pressure Transmitter is made of aluminium, if it is mounted in an area where the use of category 1 G apparatus is required, it must be installed such, that, even in the event of rare incidents, ignition sources due to impact and friction sparks are excluded.

[Installation Diagram]



*1: In any safety barriers used the output current must be limited by a resistor "R" such that Imaxout-Uz/R.

WARNING

To satisfy IP66 or IP67, apply waterproof glands to the electrical connection port.

b. CENELEC ATEX (KEMA) Flameproof Type

Caution for CENELEC ATEX (KEMA) flameproof type.

Note 1. Model EJX Series pressure transmitters with optional code /KF21 for potentially explosive atmospheres:

- No. KEMA 07ATEX0109
- Applicable Standard: EN 60079-0:2006, EN 60079-1:2004, EN 61241-0:2006, EN 61241-1:2004
- Type of Protection and Marking Code: Ex d IIC T6...T4, Ex tD A21 IP6x T85, T100, T120
- Group: II
- Category: 2G, 2D
- Enclosure: IP66 and IP67
- Temperature Class for gas-poof:
  T6, T5, and T4
- Ambient Temperature for gas-proof:
  –50* to 75°C (T6), –50* to 80°C (T5), and –50* to 75°C (T4)
  * –15°C when /HE is specified.
- Maximum Process Temperature (Tp.) for gas-proof:
  85°C (T6), 100°C (T5), and 120°C (T4)
- Maximum Surface Temperature for dust-proof:
  T85°C (Tamb.: –40* to 40°C, Tp.: 80°C)
  T100°C (Tamb.: –40* to 60°C, Tp.: 100°C)
  T120°C (Tamb.: –40* to 80°C, Tp.: 120°C)
  * –15°C when /HE is specified.

Note 2. Electrical Data

- Supply voltage: 42 V dc max.
- Output signal: 4 to 20 mA

Note 3. Installation
- All wiring shall comply with local installation requirement.
- The cable entry devices shall be of a certified flameproof type, suitable for the conditions of use.

Note 4. Operation
- Keep the "WARNING" label attached to the transmitter.
  WARNING: AFTER DE-ENERGIZING, DELAY 5 MINUTES BEFORE OPENING. WHEN THE AMBIENT TEMP.≥65°C, USE HEAT-RESISTING CABLES≥90°C.
- Take care not to generate mechanical sparking when accessing to the instrument and peripheral devices in a hazardous location.

Note 5. Maintenance and Repair
- The instrument modification or part replacement by other than an authorized representative of Yokogawa Electric Corporation is prohibited and will void KEMA Flameproof Certification.

WARNING

To satisfy IP66 or IP67, apply waterproof glands to the electrical connection port.

c. CENELEC ATEX (KEMA) Intrinsically Safe Type/CENELEC ATEX (KEMA) Flameproof Type/CENELEC ATEX Type n

Model EJX Series pressure transmitters with optional code /KU21 or /V1U can be selected the type of protection CENELEC ATEX (KEMA) Intrinsically Safe, Flameproof or CENELEC ATEX Type n for use in hazardous locations.

Note 1. For the installation of this transmitter, once a particular type of protection is selected, any other type of protection cannot be used. The installation must be in accordance with the description about the type of protection in this user's manual.

Note 2. In order to avoid confusion, unnecessary marking is crossed out on the label other than the selected type of protection when the transmitter is installed.

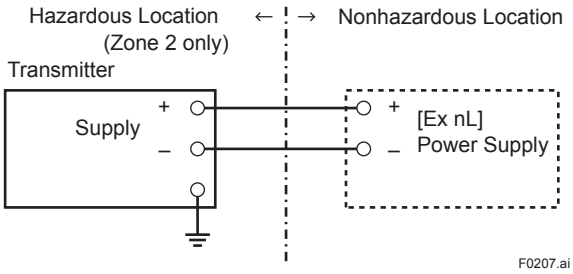
- **CENELEC ATEX Type of Protection "n"**
  - Applicable Standard: EN 60079-15
  - Referential Standards: IEC60079-0, IEC 60079-11
  - Type of Protection and Marking Code: Ex nL IIC T4
  - Temperature Class: T4
  - Enclosure: IP66 and IP67
  - Process Temperature: 120°C max.
  - Ambient Temperature: –50* to 60°C
    * –15°C when /HE is specified.

Note 1. Electrical Data
Ui = 30 V
Effective internal capacitance; Ci = 10 nF
Effective internal inductance; Li = 0 mH

Note 2. Installation
- All wiring shall comply with local installation requirements. (refer to the installation diagram)

Note 3. Maintenance and Repair
- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void Type of Protection "n".

[Installation Diagram]

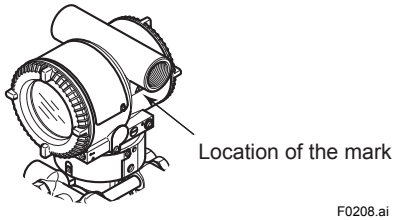


Ratings of the Power Supply as follows;
Maximum Voltage: 30 V

(2) Electrical Connection

A mark indicating the electrical connection type is stamped near the electrical connection port. These marks are as followed.

Screw Size	Marking
ISO M20 × 1.5 female	⚠M
ANSI 1/2 NPT female	⚠A or ⚠W



(3) Installation

WARNING

- All wiring shall comply with local installation requirements and the local electrical code.
- There is no need for conduit seal in Division 1 and Division 2 hazardous locations because this product is sealed at the factory.

(4) Operation

WARNING

- OPEN CIRCUIT BEFORE REMOVING COVER. INSTALL IN ACCORDANCE WITH THIS USER'S MANUAL
- Take care not to generate mechanical sparking when access to the instrument and peripheral devices in a hazardous location.

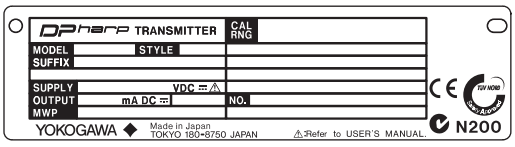
(5) Maintenance and Repair

WARNING

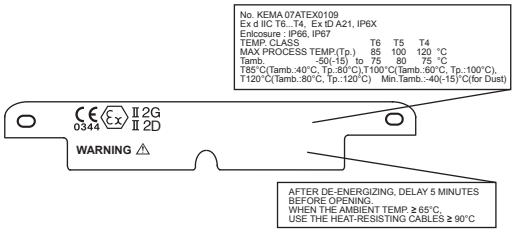
The instrument modification or parts replacement by other than an authorized Representative of Yokogawa Electric Corporation is prohibited and will void the certification.

(6) Name Plate

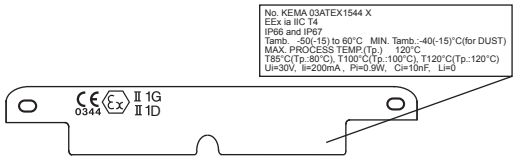
- Name plate



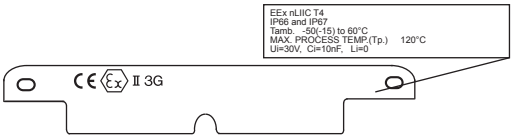
- Tag plate for flameproof type


No. KEMA 07ATEX0109
Ex d IIC T6...T4, Ex tD A21, IP6X
Enlcosure : IP66, IP67
TEMP. CLASS T6 T5 T4
MAX PROCESS TEMP.(Tp.) 85 100 120 °C
Tamb. -50(-15) to 75 80 75 °C
T85°C(Tamb.:40°C, Tp.:80°C),T100°C(Tamb.:60°C, Tp.:100°C),
T120°C(Tamb.:80°C, Tp.:120°C) Min.Tamb.:-40(-15)°C(for Dust)
0344
II 2G
II 2D
WARNING
AFTER DE-ENERGIZING, DELAY 5 MINUTES BEFORE OPENING.
WHEN THE AMBIENT TEMP. ≥ 65°C,
USE THE HEAT-RESISTING CABLES ≥ 90°C

- Tag plate for intrinsically safe type



- Tag plate for type n protection



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MODEL: Specified model code.
STYLE: Style code.
SUFFIX: Specified suffix code.
SUPPLY: Supply voltage.
OUTPUT: Output signal.
MWP: Maximum working pressure.
CAL RNG: Specified calibration range.
NO.: Serial number and year of production*1.
TOKYO 180-8750 JAPAN:
The manufacturer name and the address*2.

*1: The first digit in the final three numbers of the serial number appearing after "NO." on the nameplate indicates the year of production. The following is an example of a serial number for a product that was produced in 2010:

91K819857 032

The year 2010

*2: "180-8750" is a zip code which represents the following address.

2-9-32 Nakacho, Musashino-shi, Tokyo Japan

2.9.4 IECEx Certification

Model EJX Series pressure transmitters with optional code /SU2 can be selected the type of protection (IECEx Intrinsically Safe/type n or flameproof) for use in hazardous locations.

Note 1. For the installation of this transmitter, once a particular type of protection is selected, any other type of protection cannot be used. The installation must be in accordance with the description about the type of protection in this instruction manual.

Note 2. In order to avoid confusion, unnecessary marking is crossed out on the label other than the selected type of protection when the transmitter is installed.

a. IECEx Intrinsically Safe Type / type n

Caution for IECEx Intrinsically safe and type n.

Note 1. Model EJX Series differential, gauge, and absolute pressure transmitters with optional code /SU2 are applicable for use in hazardous locations

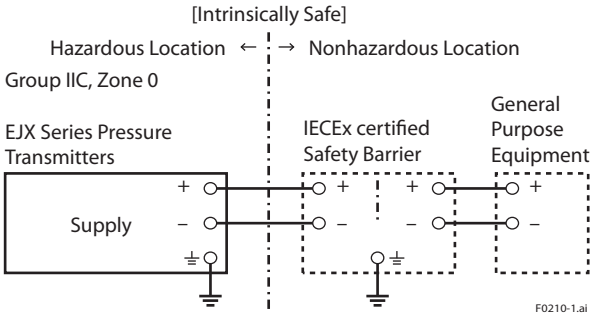
- No. IECEx CSA 05.0005
- Applicable Standard: IEC 60079-0:2000, IEC 60079-11:1999, IEC 60079-15:2001
- Ex ia IIC T4, Ex nL IIC T4
- Ambient Temperature: –50* to 60°C
  * –15°C when /HE is specified.
- Max. Process Temp.: 120°C
- Enclosure: IP66 and IP67

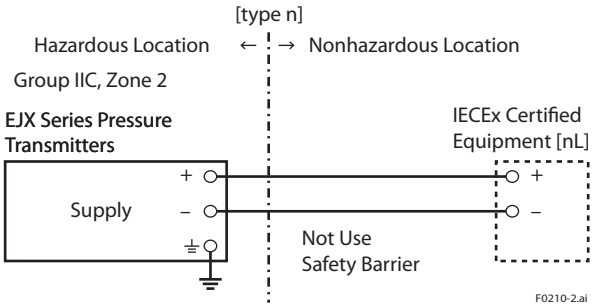
Note 2. Entity Parameters

- Intrinsically safe ratings are as follows:
  Maximum Input Voltage (Vmax/Ui) = 30 V
  Maximum Input Current (Imax/Ii) = 200 mA
  Maximum Input Power (Pmax/Pi) = 0.9 W
  Maximum Internal Capacitance (Ci) = 10 nF
  Maximum Internal Inductance (Li) = 0 µH
- Type "n" ratings are as follows:
  Maximum Input Voltage (Vmax/Ui) = 30 V
  Maximum Internal Capacitance (Ci) = 10 nF
  Maximum Internal Inductance (Li) = 0 µH
- Installation Requirements
  Uo ≤ Ui, Io ≤ Ii, Po ≤ Pi,
  Co ≥ Ci + Ccable, Lo ≥ Li + Lcable
  Voc ≤ Vmax, Isc ≤ Imax,
  Ca ≥ Ci + Ccable, La ≥ Li + Lcable
  Uo, Io, Po, Co, Lo, Voc, Isc, Ca and La are parameters of barrier.

Note 3. Installation

- In any safety barrier used output current must be limited by a resistor 'R' such that Io=Uo/R.
- The safety barrier must be IECEx certified.
- Input voltage of the safety barrier must be less than 250 Vrms/Vdc.
- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation and will void IECEx Intrinsically safe and type n certification.





b. IECEx Flameproof Type

Caution for IECEx flameproof type.

Note 1. Model EJX Series pressure transmitters with optional code /SF2 or /SU2 are applicable for use in hazardous locations:

- No. IECEx CSA 07.0008
- Applicable Standard: IEC60079-0:2004, IEC60079-1:2003
- Flameproof for Zone 1, Ex d IIC T6...T4
- Enclosure: IP66 and IP67
- Maximum Process Temperature: 120°C (T4), 100°C (T5), 85°C (T6)
- Ambient Temperature: –50* to 75°C (T4), –50* to 80°C (T5), –50* to 75°C (T6)
  * –15°C when /HE is specified.
- Supply Voltage: 42 V dc max.
- Output Signal: 4 to 20 mA dc

Note 2. Wiring
- In hazardous locations, the cable entry devices shall be of a certified flameproof type, suitable for the conditions of use and correctly installed.
- Unused apertures shall be closed with suitable flameproof certified blanking elements.

Note 3. Operation
- WARNING:
  AFTER DE-ENERGIZING, DELAY 5 MINUTES BEFORE OPENING.
- WARNING:
  WHEN AMBIENT TEMPERATURE ≥ 65°C, USE THE HEAT-RESISTING CABLES ≥ 90°C.
- Take care not to generate mechanical sparking when accessing to the instrument and peripheral devices in a hazardous location.

Note 4. Maintenance and Repair
- The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void IECEx Certification.

2.10 EMC Conformity Standards

EN61326-1 Class A, Table2 (For use in industrial locations)
EN61326-2-3

CAUTION

To meet EMC regulations, Yokogawa recommends that customers run signal wiring through metal conduits or use shielded twisted-pair cabling when installing EJX series transmitters in a plant.

2.11 Pressure Equipment Directive (PED)

(1) General

EJX Series pressure transmitters are categorized as piping under the pressure accessories section of directive 97/23/EC, which corresponds to Article 3, Paragraph 3 of PED, denoted as Sound Engineering Practice (SEP).

(2) Technical Data

Article 3, Paragraph 3 of PED, denoted as Sound Engineering Practice (SEP).

(3) Operation

CAUTION

- The temperature and pressure of fluid should be maintained at levels that are consistent with normal operating conditions.
- The ambient temperature should be maintained at a level that is consistent with normal operating conditions.
- Please take care to prevent water hammer and the like from inducing excessive pressures in pipes and valves. If phenomena are likely, install a safety valve or take some other appropriate measure to prevent pressure from exceeding PS.
- Take appropriate measures at the device or system level to protect transmitters if they are to be operated near an external heat source.

2.12 Low Voltage Directive

Applicable standard: EN61010-1

(1) Pollution Degree 2

"Pollution degree" describes the degree to which a solid, liquid, or gas which deteriorates dielectric strength or surface resistivity is adhering. " 2 " applies to normal indoor atmosphere. Normally, only non-conductive pollution occurs. Occasionally, however, temporary conductivity caused by condensation must be expected.

(2) Installation Category I

"Overvoltage category (Installation category)" describes a number which defines a transient overvoltage condition. It implies the regulattion for impulse withstand voltage. " I " applies to electrical equipment which is supplied from the circuit when appropriate transient overvoltage control means (interfaces) are provided.

3. Component Names

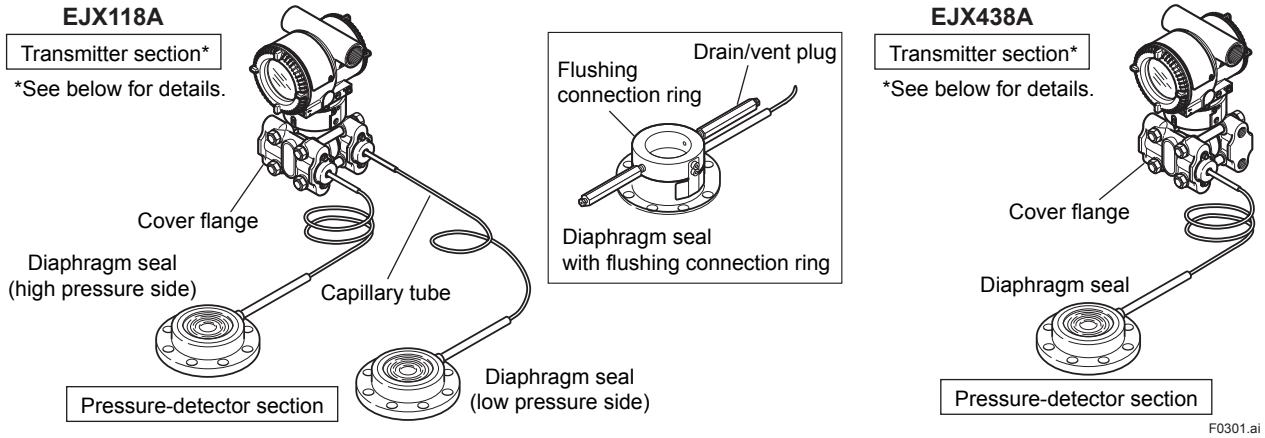
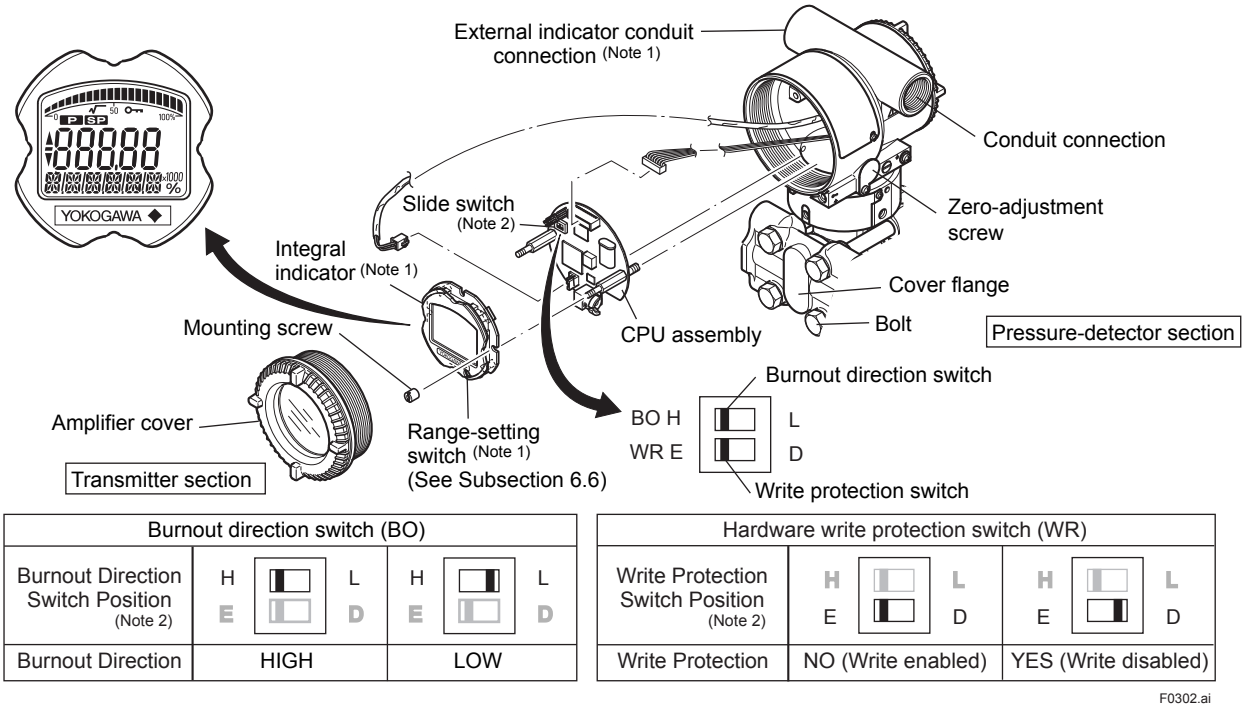


Figure 3.1 Component Names (External View of Flush type)



Burnout direction switch (BO)		
Burnout Direction Switch Position (Note 2)	H / E — L / D	H / E — L / D
Burnout Direction	HIGH	LOW

Hardware write protection switch (WR)		
Write Protection Switch Position (Note 2)	H / E — L / D	H / E — L / D
Write Protection	NO (Write enabled)	YES (Write disabled)

F0302.ai

Note 1: See subsection 8.2, “Model and Suffix Codes,” for details.
Note 2: Set the switches as shown in the figure above to set the burn-out direction and write protection. The Burnout switch is set to the H side for delivery (unless option code /C1 or /C2 is specified in the order), and the hardware write protection switch is set to E side.
The setting of the switches can be confirmed via communication. An external zero adjustment screw can only be disabled by communication. To disable the screw, set a parameter before activating the hardware write protect function. See each communication manual for details.

Figure 3.2 Component Names (Transmitter Section Details)

Table 3.1 Display Symbol

Display Symbol	Meaning of Display Symbol
√	Display mode is ‘square root’. (Display is not lit when ‘linear’ mode.)
▲	The output signal being zero-adjusted is increasing.
▼	The output signal being zero-adjusted is decreasing.
⚷	Write protect function is enabled.

F0303.ai

4. Installation

4.1 Precautions

Before installing the transmitter, read the cautionary notes in Section 2.4, “Selecting the Installation Location.” For additional information on the ambient conditions allowed at the installation location, refer to Subsection 8.1 “Standard Specifications.”

IMPORTANT

- When welding piping during construction, take care not to allow welding currents to flow through the transmitter.
- Do not step on this instrument after installation.
- For the EJX438A, there is a small hole in the low pressure side cover flange that is used to measure the atmospheric pressure. The hole must not face upward. See section 8.4, “Dimensions,” for the location of the hole.
- Never loosen the four bolts securing the cover flanges (Refer to figure 3.2.) If the seal liquid leaks, the transmitter cannot be used.

4.2 Mounting the Diaphragm Seals

Mount the diaphragm seals using the flanges as shown in Figure 4.1 Figure 4.2 shows how to mount the diaphragm seals on a tank. The mating flange, gasket, bolts and nuts are to be procured by the customer.

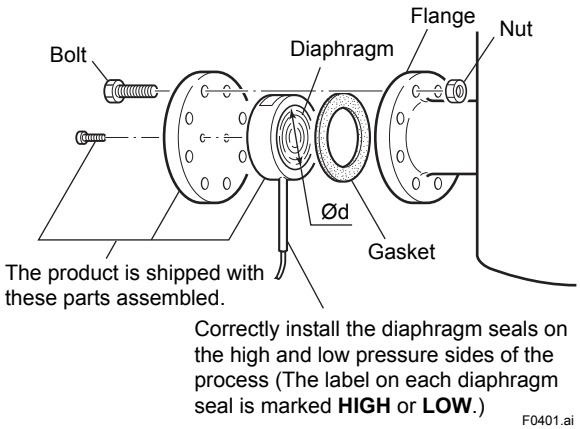

Flange
Nut
Bolt
Diaphragm
Ød
Gasket
The product is shipped with these parts assembled.
Correctly install the diaphragm seals on the high and low pressure sides of the process (The label on each diaphragm seal is marked **HIGH** or **LOW**.)
F0401.ai

Figure 4.1 Mounting the Diaphragm Seals

IMPORTANT

Please use a gasket with an inside diameter (ød) that is greater than the diameter of the diaphragm seal. If a gasket with a smaller inside diameter is used, the diaphragm may not function correctly. (Refer to Subsection 8.4 ‘Dimensions’)

IMPORTANT

- When measuring the liquid level of the tank, the minimum liquid level (zero point) must be set to a level at least 50 mm above the center of the high pressure side diaphragm seal (see Figure 4.2).
- Correctly install the diaphragm seals on the high and low pressure sides of the process, checking the label on each seal.
- To avoid measuring error duets temperature difference between the two diaphragm seals, capillary tube must be bound together. The capillary tube must be securely fixed to the tank wall to prevent movement by wind or vibration. If the capillary tube is too long, loosely coil the extra tube portion (coil diameter of 300 mm or more) and secure the coiled tube with a clamp.
- During the diaphragm seal installation, ensure as far as possible that no seal liquid head pressure is applied to the diaphragm seals.
- Exercise care so as not to damage diaphragm surfaces. Since the diaphragm protrudes approx. 1 mm from the flange surface, do not place the pressure detector section face down on a surface as this can damage the diaphragm.
- Do not sharply bend or twist capillary tube or apply excessive stress to them.

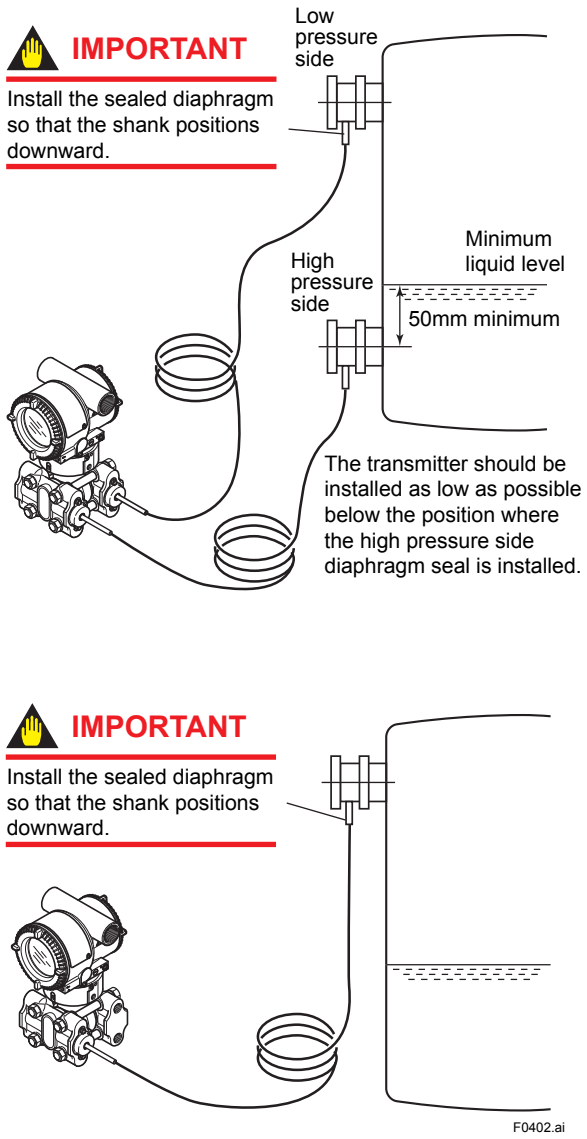

IMPORTANT
Install the sealed diaphragm so that the shank positions downward.
Low pressure side
High pressure side
Minimum liquid level
50mm minimum
The transmitter should be installed as low as possible below the position where the high pressure side diaphragm seal is installed.
IMPORTANT
Install the sealed diaphragm so that the shank positions downward.
F0402.ai

Figure 4.2 Installing the Diaphragm Seals to a Tank

4.3 Transmitter Mounting

- The transmitter can be mounted on a nominal 50 mm (2-inch) pipe using the mounting bracket supplied, as shown in Figure 4.3. The transmitter can be mounted on either a horizontal or a vertical pipe.
- When mounting the bracket on the transmitter, tighten the (four) bolts that hold the transmitter to a torque of approximately 39 N·m {4 kgf·m}.

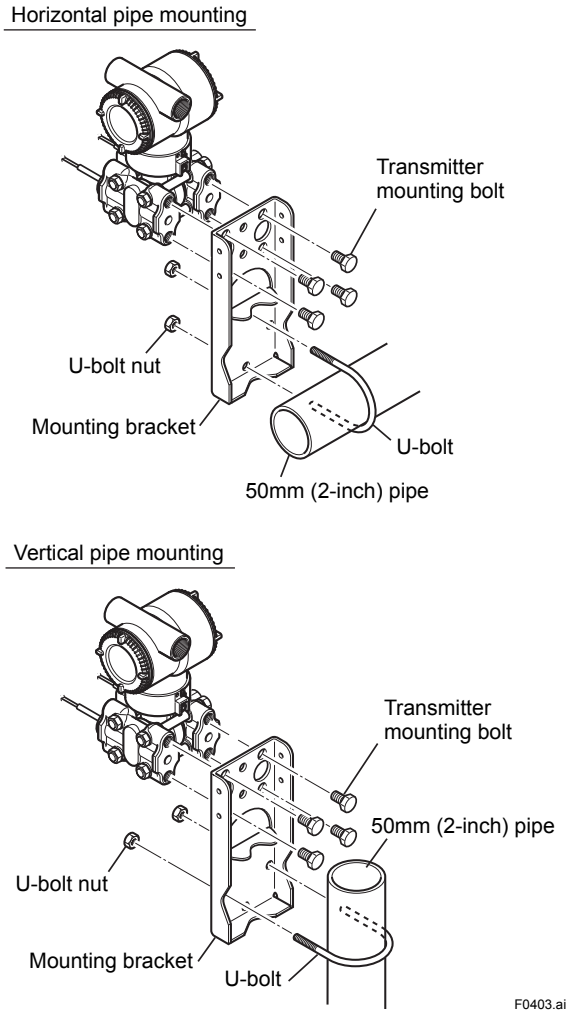


Figure 4.3 Transmitter Mounting

IMPORTANT

Never loosen the four bolts securing the cover flange or the screws at the joints between the capillary tube and cover flanges (Refer to figure 3.2.) If the seal liquid leaks, the transmitter cannot be used.

IMPORTANT

The transmitter should be installed at least 600 mm below the high pressure (HP) process connection to ensure a positive head pressure of fill fluid. Pay special attention to vacuum applications.
If it can not be installed at least 600 mm below the HP process connection, please use the equation below:

$$h=\frac{(P-P0)\times dHg}{ds}\times 7.5\times 10^{-3}\ [mm]$$

h: Vertical height between the HP process connection and the transmitter (mm)
h≤0: Install the transmitter at least h (mm) below the HP process connection
h>0: Install the transmitter at most h (mm) above the HP process connection
P: Pressure in the tank (Pa abs)
P0: Minimum working pressure limit of the transmitter (Pa abs) If the ambient temperature range is –10 to 50°C.
2951 (Wetted parts material code SW, SE and SY)
3185 (Wetted parts material code TW)
4573 (Wetted parts material code HW)
3810 (Wetted parts material code UW)
ds: Specific gravity of fill fluid (at 25°C), refer to table 8.1 on section 8.1 Standard Specifications.
dHg:Specific gravity of the Mercury 13.6 (at 25°C)

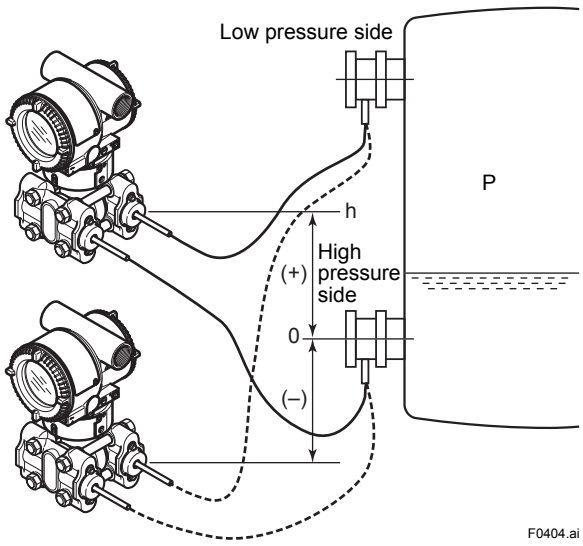


Figure 4.4 Example of Installation to Tank for Differential Pressure Transmitter (Caution on Installation)

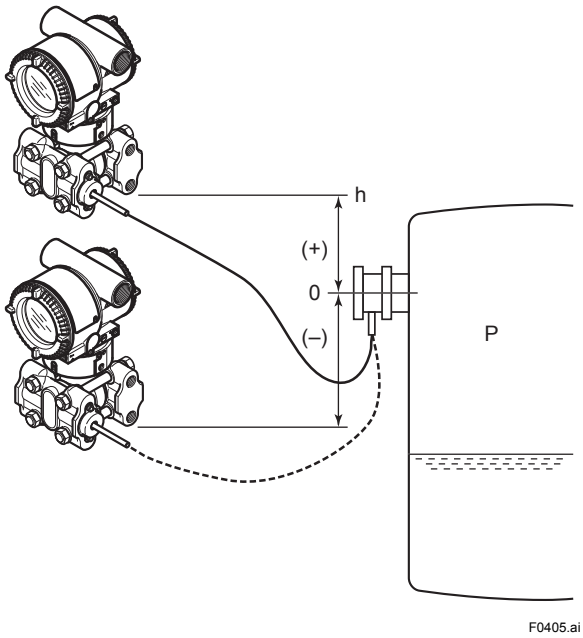


Figure 4.5 Example of Installation to Tank for Gauge Pressure Transmitter (Caution on Installation)

4.4 Mounting the Flushing Connection Ring

4.4.1 Mounting to Pressure Detector Section

The flushing connection ring is mounted to the pressure detector section as shown in Figure 4.6. At the factory shipment, the flushing connection ring is already assembled and attached to process detector section.

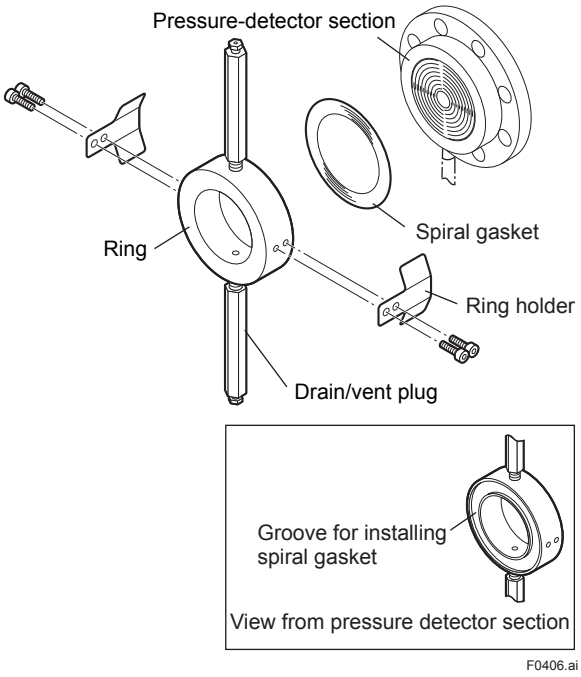


Figure 4.6 Mounting to Pressure Detector Section

(1) Mount the ring holder on the ring and loosely tighten the mounting screws.
(2) Place the spiral gasket in the ring groove. With the ring correctly aligned and flush with the face of the pressure detector, securely tighten each ring holder's mounting screws.
(3) Position the ring so that the drain/vent plugs are aligned straight up and down.

4.4.2 Mounting to Process Flange

Tighten the bolts to completely close the gap between the ring and the pressure detector section. The mating flange, gasket, stud bolts and nuts are to procured by the customer.

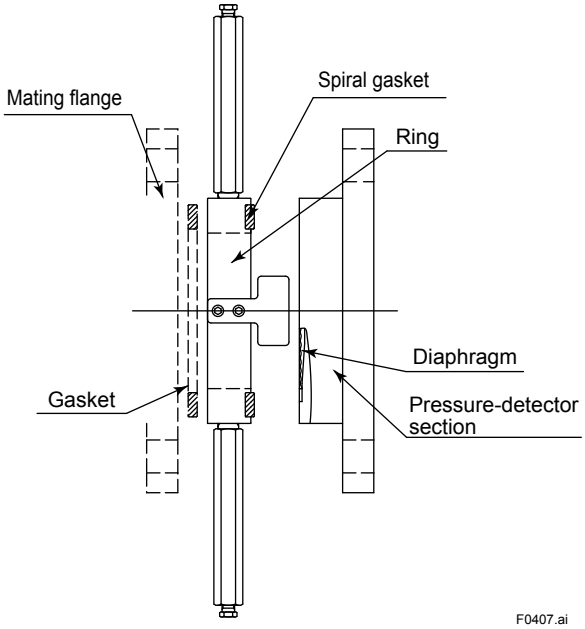


Figure 4.7 Mounting to Process Flange

IMPORTANT

- Confirm that there is no gap between the ring and the process-detector section after they are mounted on the process flange. A gap can lead to a sudden, explosive release of process fluids.
- When mounting or removing the ring, take care not to tilt the pressure detector downward as the ring can slip off and cause injury.
- When re-mounting the ring, use the new spiral gasket as shown in below table.

Table 4.1 Spiral Gasket for Pressure Detector Section Side*

Part number	Size	Description
F9350SV	ø100×ø120×t4.5	For 3-inch flange
F9970XF	ø100×ø120×t4.5	For 3-inch flange**
F9350ST	ø70×ø90×t4.5	For 2-inch flange
F9970XD	ø70×ø90×t4.5	For 2-inch flange**
F9346ZH	ø60×ø75×t4.5	For 1 1/2-inch flange
F9970XB	ø60×ø75×t4.5	For 1 1/2-inch flange**

*: Material; 316SST (Hoop), PTFE Teflon (Filler)
**: For oil-prohibited use (Option code: /K1, /K2, /K5, /K6)

4.5 Affixing the Teflon Film

The FEP Teflon option includes a teflon film and fluorinated oil.
Before mounting the diaphragm seal to the process flange, affix the teflon film as follows:

IMPORTANT

1) Position the diaphragm seal so that the diaphragm is in a upward position.
2) Pour the fluorinated oil on the diaphragm and gasket area covering it completely and evenly. Be careful not to scratch the diaphragm or change the its shape.
3) Affix the teflon film over the diaphragm and gasket area.
4) Next, carefully inspect the cover and try to identify any entrapped air between the diaphragm and the teflon film. The air must be removed to ensure optimum performance. If air pockets are present, use your fingers to remove the air by starting at the center of the diaphragm and work your way out.
5) Position the gasket on the Teflon film.
6) Mount the transmitter onto the process flange.

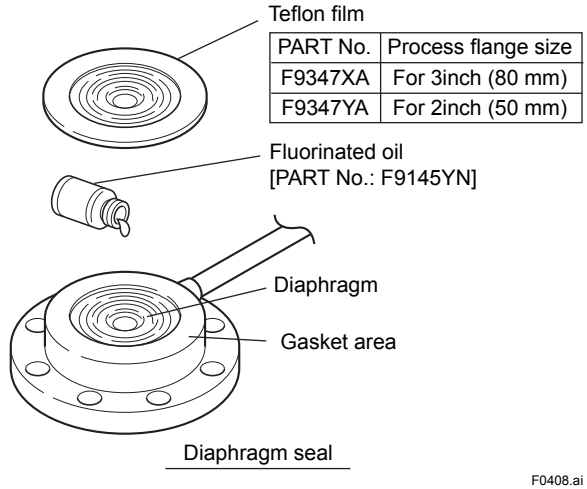


Figure 4.8 Affixing the Teflon Film

4.6 Rotating Transmitter Section

The transmitter section can be rotated in either direction to any desired position. Note that there is a stopper which prevents the transmitter from being rotated more than 360°.

(1) Using the Allen wrench, remove the two setscrews securing the transmitter section to the capsule assembly.
(2) Rotate the transmitter section slowly to the desired position.
(3) Tighten the two setscrews to a torque of 1.5 N·m {15 kgf·cm}.

IMPORTANT

Do not rotate the transmitter section more than the above limit.

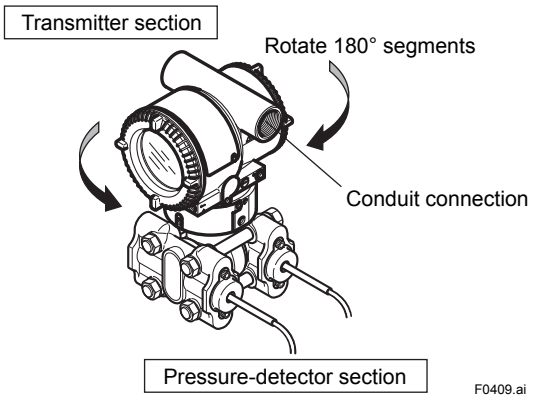


Figure 4.9 Rotating Transmitter Section

4.7 Changing Integral Indicator Direction

IMPORTANT

- Always turn OFF power and shut off and release pressures before disassembly.
- For changing the integral indicator direction, the transmitter must be removed to a non-hazardous area.

An integral indicator can be installed in the following three directions, Refer to subsection 7.4 for attaching and removing the integral indicator.

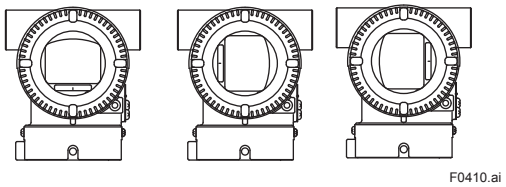


Figure 4.10 Integral Indicator Direction

5. Wiring

5.1 Wiring Precautions

IMPORTANT

- Lay wiring as far as possible from electrical noise sources such as large capacity transformers, motors, and power supplies.
- Remove the electrical connection dust cap before wiring.
- All threaded parts must be treated with waterproofing sealant. (A non-hardening silicone group sealant is recommended.)
- To prevent noise pickup, do not pass signal and power cables through the same ducts.
- Explosion-protected instruments must be wired in accordance with specific requirements (and, in certain countries, legal regulations) in order to preserve the effectiveness of their explosion-protected features.
- The terminal box cover is locked by an Allen head bolt (a shrouding bolt) on ATEX flameproof type transmitters. When the shrouding bolt is driven clockwise using an Allen wrench, it goes in. The cover lock can then be released and the cover can be opened by hand. See subsection 7.4 "Disassembly and Reassembly" for details.
- Plug and seal an unused conduit connection.

5.2 Selecting the Wiring Materials

(a) Use stranded leadwires or cables which are the same as or better than 600 V grade PVC insulated wire (JIS C3307) or its equivalent.
(b) Use shielded wires in areas that are susceptible to electrical noise.
(c) In areas with higher or lower ambient temperatures, use appropriate wires or cables.
(d) In environment where oils, solvents, corrosive gases or liquids may be present, use wires or cables that are resistant to such substances.
(e) It is recommended that crimp-on solderless terminal lugs (for 4 mm screws) with insulating sleeves be used for leadwire ends.

5.3 Connections of External Wiring to Terminal Box

5.3.1 Power Supply Wiring Connection

Connect the power supply wiring to the SUPPLY + and – terminals. When /AL is specified, also refer to subsection 5.3.5.

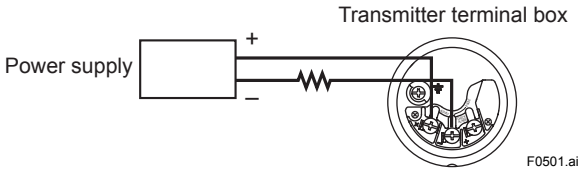


Figure 5.1 Power Supply Wiring Connection

5.3.2 External Indicator Connection

Available only when /AL is not specified.

Connect wiring for external indicators to the CHECK + and – terminals.

(Note) Use a external indicator whose internal resistance is 10 Ω or less.

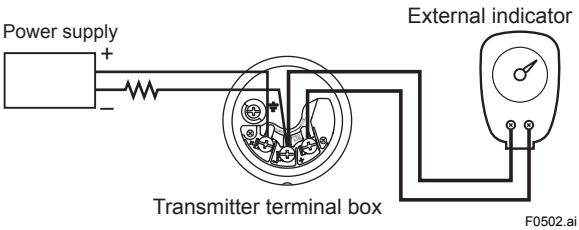


Figure 5.2 External Indicator Connection

5.3.3 Communicator Connection

Connect the BT200 or HART275 HHT to the SUPPLY + and – terminals. (Use hooks.)

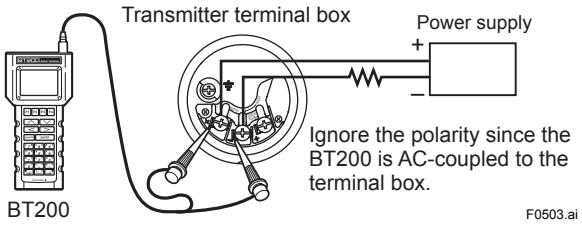


Figure 5.3 BT200 Connection

5.3.4 Check Meter Connection

Available only when /AL is not specified.

Connect the check meter to the CHECK + and – terminals. (Use hooks.)

- A 4 to 20 mA DC output signal from the CHECK + and – terminals.

(Note) Use a check meter whose internal resistance is 10 Ω or less.

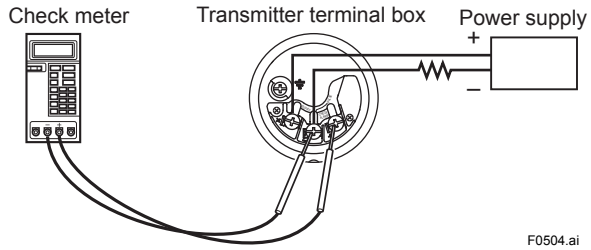


Figure 5.4 Check Meter Connection

5.3.5 Status Output Connection

When option code /AL is specified, connect the external wiring as shown in Figure 5.5.

To configure and activate the process alarm function and status output, it is necessary to set some parameters. Refer to each communication manual for procedures.

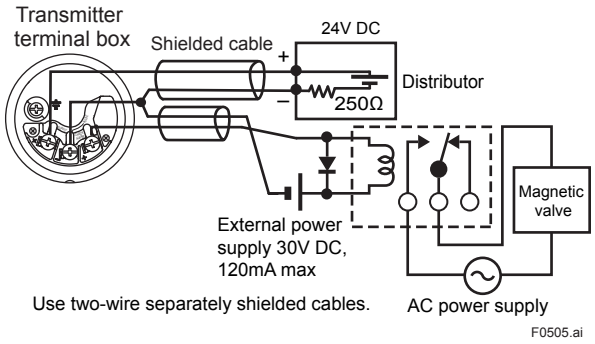


Figure 5.5 Status Output Connection

5.4 Wiring

5.4.1 Loop Configuration

Since the DPharp uses a two-wire transmission system, signal wiring is also used as power wiring.

DC power is required for the transmitter loop. The transmitter and distributor are connected as shown below.

For details of the power supply voltage and load resistance, see section 5.6; for communications line requirements, see section 8.1.

(1) General-use Type and Flameproof Type

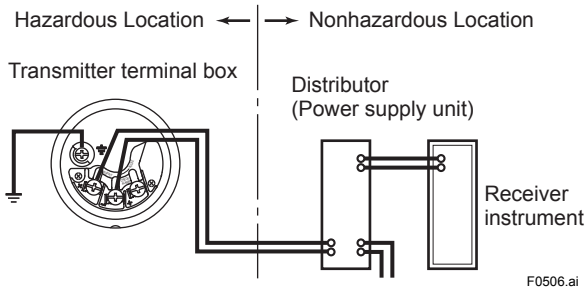


Figure 5.6 Connection between Transmitter and Distributor

(2) Intrinsically Safe Type

With the intrinsically safe type, a safety barrier must be included in the loop.

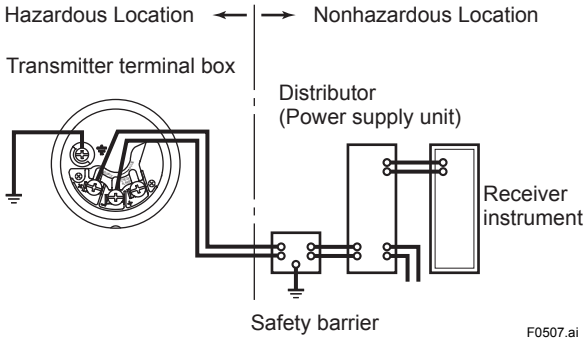


Figure 5.7 Connection between Transmitter and Distributor

5.4.2 Wiring Installation

(1) General-use Type and Intrinsically Safe Type

With the cable wiring, use a metallic conduit or waterproof glands.

- Apply a non-hardening sealant to the terminal box connection port and to the threads on the flexible metal conduit for waterproofing.

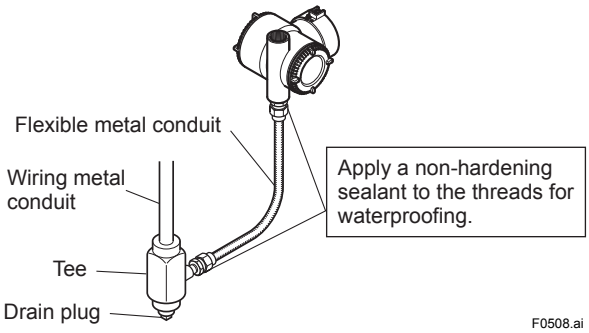


Figure 5.8 Typical Wiring Using Flexible Metal Conduit

(2) Flameproof Type

Wire cables through a flameproof packing adapter, or use a flameproof metal conduit.

■ Wiring cable through flameproof packing adapter.
- Apply a non-hardening sealant to the terminal box connection port and to the threads on the flameproof packing adapter for waterproofing.

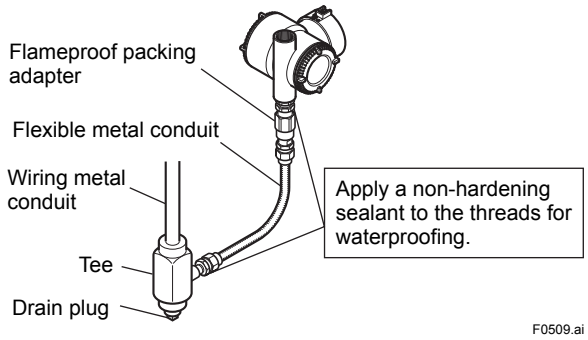


Figure 5.9 Typical Cable Wiring Using Flameproof Packing Adapter

■ Flameproof metal conduit wiring
- A seal fitting must be installed near the terminal box connection port for a sealed construction.
- Apply a non-hardening sealant to the threads of the terminal box connection port, flexible metal conduit and seal fitting for waterproofing.

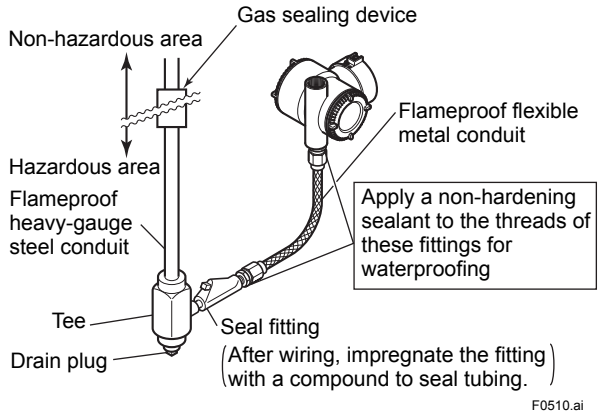

Gas sealing device
Non-hazardous area
Hazardous area
Flameproof heavy-gauge steel conduit
Flameproof flexible metal conduit
Apply a non-hardening sealant to the threads of these fittings for waterproofing
Tee
Seal fitting
Drain plug
After wiring, impregnate the fitting with a compound to seal tubing.
F0510.ai

Figure 5.10 Typical Wiring Using Flameproof Metal Conduit

5.5 Grounding

Grounding is always required for the proper operation of transmitters. Follow the domestic electrical requirements as regulated in each country. For a transmitter with a built-in lightning protector, grounding should satisfy ground resistance of 10Ω or less.

Ground terminals are located on the inside and outside of the terminal box. Either of these terminals may be used.

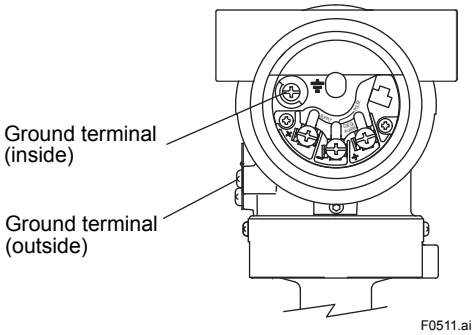


Figure 5.11 Ground Terminals

5.6 Power Supply Voltage and Load Resistance

When configuring the loop, make sure that the external load resistance is within the range in the figure below.

(Note) In case of an intrinsically safe transmitter, external load resistance includes safety barrier resistance.

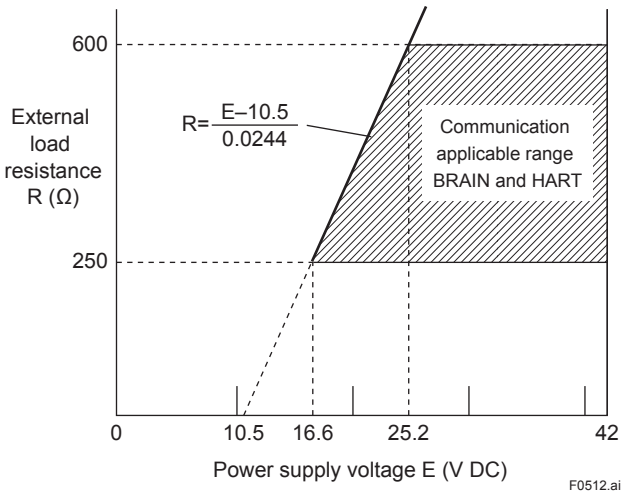


Figure 5.12 Relationship between Power Supply Voltage and External Load Resistance

6. Operation

6.1 Preparation for Starting Operation

This section describes the operation procedure for the EJX118A as shown in Figure 6.1 when measuring liquid level in a closed tank, and EJX438A as shown in Figure 6.2 when measuring pressure in a tank.

(a) Confirm that there is no leak in the connecting part of each diaphragm seal mounting flange.
(b) Turn ON power and connect the communicator. Open the terminal box cover and connect the communicator to the SUPPLY + and – terminals.
(c) Using the communicator, confirm that the transmitter is operating properly. Check parameter values or change the setpoints as necessary.
See IM 01C25T03-01E (BRAIN communication) or IM 01C25T01-01E (HART communication) for communicator operation.
If the transmitter is equipped with an integral indicator, its indication can be used to confirm that the transmitter is operating properly.

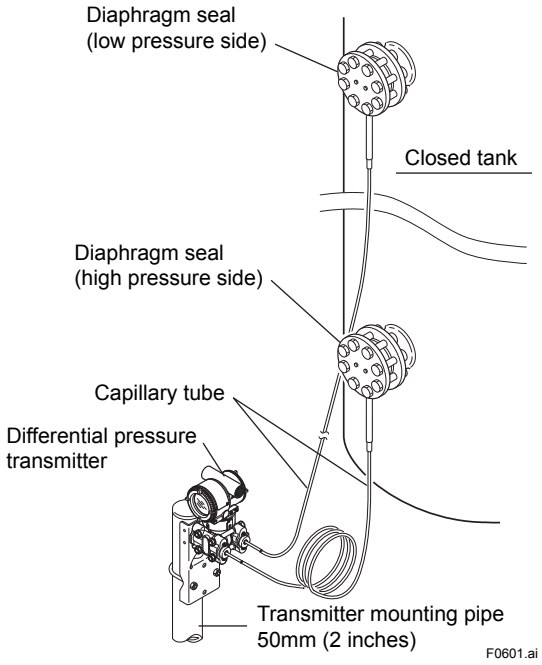


Figure 6.1 Liquid Level Measurement in a Closed Tank

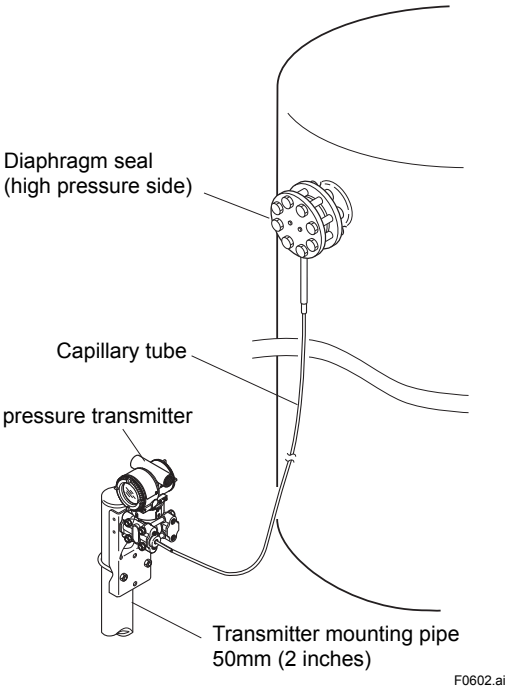
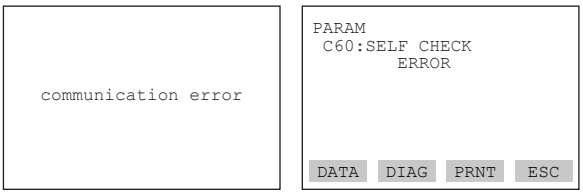


Figure 6.2 Pressure Measurement

■ Confirming that Transmitter is Operating Properly

Using the BT200

- If the wiring system is faulty, 'communication error' appears on the display.
- If the transmitter is faulty, 'SELF CHECK ERROR' appears on the display.



Communication error (Faulty wiring)

Self-diagnostic error (Faulty transmitter)

Using the integral indicator

- If the wiring system is faulty, the display stays blank.
- If the transmitter is faulty, an error code is displayed.

Self-diagnostic error on the integral indicator (Faulty transmitter)

F0604.ai

NOTE

If any of the above errors are indicated on the display of the integral indicator or the communicator, refer to subsection 7.5.3 for corrective action.

■ Verify and Change Transmitter Parameter Setting and Values

The parameters related to the following items are set at factory as specified by the customer.

- Calibration range
- Integral indicator display
- Output mode
- Software damping (optional)

Other parameters like following are shipped with the default setting.

- Low-cut
- Process alarm setting
- Static pressure range
- Signal characterizer
- Write protection

To confirm or change the values, see IM 01C25T01-01E or 01C25T03-01E.

6.2 Zero Point Adjustment

After completing preparations for operating the transmitter, adjust the zero point.

Zero point adjustment can be done by turning the transmitter's zero-adjustment screw or by using the communicator. This section describes the procedure for the zero-adjustment screw. For the communicator procedure, see the communication manual.

IMPORTANT

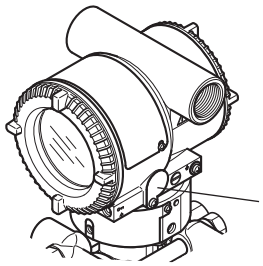
Do not turn off the power to the transmitter immediately after performing a zero point adjustment. Powering off within 30 seconds of performing this procedure will return the zero point to its previous setting.

NOTE

Before performing this adjustment, make sure that the external zero adjustment function has NOT been disabled by a parameter setting.

To check the output signal, use a digital multimeter, calibrator, or communicator.

(1) When you can obtain the Low Range Value from the actual measured value of 0% (0 kPa, atmospheric pressure);



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The zero-adjustment screw is located inside the cover.

Use a slotted screwdriver to turn the zero-adjustment screw. Turn the screw clockwise to increase the output or counterclockwise to decrease the output. The zero point adjustment can be made with a resolution of 0.01% of the setting range. The degree of zero adjustments varies with the screw turning speed; turn the screw slowly to make a fine adjustment, quickly to make a rough adjustment.

When adjusting the transmitter zero point, the liquid level in a tank does not have to be set to the low limit (0%) of the measuring range; use a digital manometer or a glass gauge to match the transmitter output signal with the actual measured value.

(2) When you cannot obtain the Low Range Value from the actual measured value of 0%;

Adjust the transmitter output to the actual measured value obtained by a digital manometer or a glass gauge.

[Example]

The measuring range of 50 to 250 kPa; the actual measured value of 130 kPa.

$$\text{Actual measured value}=\frac{130-50}{250-50}\times 100=40.0\%$$

(=10.4mA)

Turn the screw to match the output signal to the actual measured value.

6.3 Starting Operation

After completing the zero point adjustment, follow the procedure below to start operation.

1) Confirm the operating status. If the output signal exhibits wide fluctuations (hunting) due to periodic variation in the process pressure, use the communicator to dampen the transmitter output signal. Confirm the hunting using a receiving instrument or the integral indicator, and set the optimum damping time constant.
2) After confirming the operating status, perform the following:

IMPORTANT

- Remove the communicator from the terminal box, and confirm that none of the terminal screws are loose.
- Close the terminal box cover and the amplifier cover. Screw each cover in tightly until it will not turn further.
- There are two covers that must be locked on the ATEX Flameproof type transmitters. An Allen head bolt (shrouding bolt) under the edge of each cover is used to lock the cover. When the shrouding bolt is driven counterclockwise with an Allen wrench, the bolt rotates upward and locks the cover. (See page 7-3.) After locking the covers, confirm that they are secure and cannot be opened by hand.
- Tighten the zero-adjustment cover mounting screw to secure the cover.

6.4 Shutting Down Operation

Turn off the power.

NOTE

Whenever shutting down the transmitter for a long period, detach the transmitter (diaphragm seals) from the tank.

6.5 Venting or Draining Transmitter Process-Detector Section

If condensate (or gas) collects in the transmitter process-detector section, the measured pressure may be in error. If it is not possible to configure the piping for self draining (or self-venting) operation, you will need to loosen the drain (vent) screw on the flushing connection ring to completely drain (vent) any stagnated liquid (gas).
However, since draining condensate or bleeding off gas gives the pressure measurement disturbance, this should not be done when the loop is in operation.

WARNING

Since the accumulated liquid (or gas) may be toxic or otherwise harmful, take appropriate care to avoid contact with the body, or inhalation of vapors.

6.5.1 Draining Condensate for Flushing Connection Ring

1) Gradually open the drain screw to drain from the flushing connection ring.
2) When the flushing connection ring is completely drained, close the drain screw.
3) Tighten the drain screw to a torque of 10 N·m {1 kgf·m}.

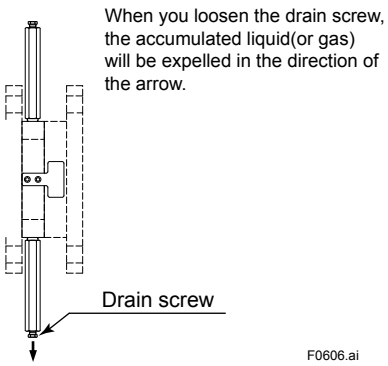

When you loosen the drain screw, the accumulated liquid(or gas) will be expelled in the direction of the arrow.
Drain screw
F0606.ai

Figure 6.3 Draining for Flushing Connection Ring

6.5.2 Venting Gas for Flushing Connection Ring

1) Gradually open the vent screw to vent gas from the flushing connection ring.
2) When the flushing connection ring is completely vented, close the vent screw.
3) Tighten the vent screw to a torque of 10 N·m {1 kgf·m}.

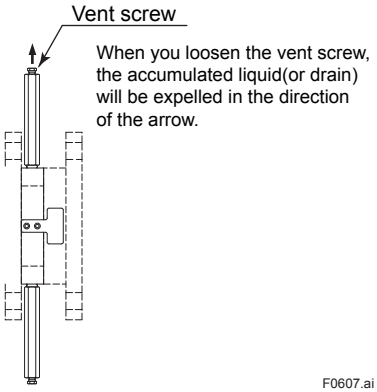

Vent screw
When you loosen the vent screw, the accumulated liquid(or drain) will be expelled in the direction of the arrow.
F0607.ai

Figure 6.4 Venting for Flushing Connection Ring

6.6 Setting the Range Using the Range-setting Switch

WARNING

The range setting switch must not be used in the hazardous area.
When it is necessary to use the switch, operate it in a non-hazardous location.

When pressure is applied to the transmitter, the low- and high-limit values for the measurement range (LRV and URV) can be changed (re-ranged) using the range-setting switch (push-button) located on the optional integral indicator plate and the external zero adjustment screw. This procedure does not require use of the communicator. However, changes in the scale range and engineering unit display settings for the integral indicator require use of the communicator.

Follow the procedure below to change the LRV and URV settings.

[Example]

Rerange LRV to 0 and URV to 50 kPa.

1) Connect the transmitter and apparatus as shown in Figure 7.1 and warm it up for at least five minutes.
2) Press the range-setting push-button. The integral indicator then displays “LRV.SET.”
3) Apply a pressure of 0 kPa (atmospheric pressure) to the transmitter. (Note 1)
4) Turn the external zero-adjustment screw in the desired direction. The integral indicator displays the output signal in %. (Note 2)
5) Adjust the output signal to 0% (1 V DC) by rotating the external zero-adjustment screw. Doing so completes the LRV setting.
6) Press the range-setting push-button. The integral indicator then displays “URV.SET.”
7) Apply a pressure of 50 kPa to the transmitter. (Note 1)
8) Turn the external zero-adjustment screw in the desired direction. The integral indicator displays the output signal in %. (Note 2)
9) Adjust the output signal to 100% (5 V DC) by rotating the external zero-adjustment screw. Doing so completes the URV setting.
10) Press the range-setting push-button. The transmitter then switches back to the normal operation mode with the measurement range of 0 to 50 kPa.

Note 1: Wait until the pressure inside the pressure-detector section has stabilized before proceeding to the next step.

Note 2: If the pressure applied to the transmitter exceeds the previous LRV (or URV), the integral indicator may display error number “AL.30” (In this case, the output signal percent and “AL.30” are displayed alternately every two seconds). Although “AL.30” is displayed, you may proceed to the next step. However, should any other error number be displayed, take the appropriate measure in reference to , “Errors and Countermeasures” in each communication manual.

IMPORTANT

- Do not turn off the power to the transmitter immediately after completion of the change in the LRV and/or URV setting(s). Note that powering off within thirty seconds after setting will cause a return to the previous settings.
- Changing LRV automatically changes URV to the following value.

URV=previous URV+(new LRV–previous LRV)

- If the range-setting push-button and external zero-adjustment screw are not touched during a range-change operation, the transmitter automatically switches back to the normal operation mode.

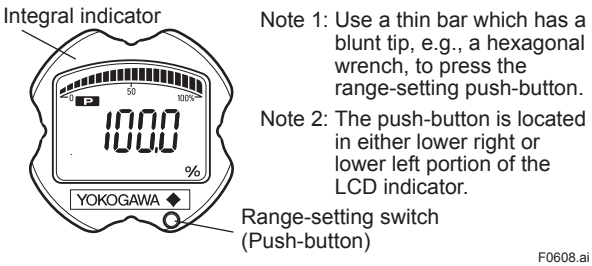


Figure 6.5 Range-setting Switch

7. Maintenance

7.1 Overview

WARNING

Since the accumulated process fluid may be toxic or otherwise harmful, take appropriate care to avoid contact with the body or inhalation of vapors when draining condensate or venting gas from the transmitter pressure-detector section and even after dismounting the instrument from the process line for maintenance.

Maintenance of the transmitter is easy due to its modular construction. This chapter describes the procedures for calibration, adjustment, and the disassembly and reassembly procedures required for component replacement.

Transmitters are precision instruments. Please carefully and thoroughly read the following sections for information on how to properly handle them while performing maintenance.

IMPORTANT

- As a rule, maintenance of this transmitter should be done in a shop that has all the necessary tools.
- The CPU assembly contains sensitive parts that can be damaged by static electricity. Take precautions such as using a grounded wrist strap when handling electronic parts or touching the board circuit patterns. Also be sure to place the removed CPU assembly into a bag with an antistatic coating.

7.2 Calibration Instruments Selection

Table 7.1 lists the instruments that can be used to calibrate a transmitter. When selecting an instrument, consider the required accuracy level. Exercise care when handling these instruments to ensure they maintain the specified accuracy.

7.3 Calibration

Use the procedure below to check instrument operation and accuracy during periodic maintenance or troubleshooting.

1) Connect the instruments as shown in figure 7.1 and warm up the instruments for at least five minutes.

IMPORTANT

- To adjust the transmitter for highest accuracy, make adjustments with the power supply voltage and load resistance including leadwire resistances set close to the conditions under which the transmitter is installed. In addition, place the process connections of both high and low pressure side on the same level.
- If the measurement range 0% point is 0 kPa or shifted in the positive direction (suppressed zero), the reference pressure should be applied as shown in the figure. If the measurement range 0% point is shifted in the negative direction (elevated zero), the reference pressure should be applied using a vacuum pump.

2) Apply reference pressures of 0%, 50%, and 100% of the measurement range to the transmitter. Calculate the errors (differences between digital voltmeter readings and reference pressures) as the pressure is increased from 0% to 100% and is decreased from 100% to 0%, and confirm that the errors are within the required accuracy.

Table 7.1 Instruments Required for Calibration

Name	Yokogawa-recommended Instrument	Remarks
Power supply	Model SDBT or SDBS distributor	4 to 20 mA DC signal
Load resistor	Model 2792 standard resistor [250 Ω ±0.005%, 3 W]	
	Load adjustment resistor [100 Ω ±1%, 1 W]	
Voltmeter	Model 2501 A digital multimeter Accuracy (10V DC range): ±(0.002% of rdg + 1 dgt)	
Digital manometer	Model MT220 precision digital manometer 1) For 10 kPa class Accuracy: ±(0.015% of rdg + 0.015% of F.S.). . . . for 0 to 10 kPa ±(0.2% of rdg + 0.1% of F.S.). . . . . for -10 to 0 kPa 2) For 130 kPa class Accuracy: ±0.02% of rdg. . . . . for 25 to 130 kPa ±5digits. . . . . for 0 to 25 kPa ±(0.2% of rdg + 0.1% of F.S.). . . . . for -80 to 0 kPa 3) For 700 kPa class Accuracy: ±(0.02% of rdg + 3digits) . . . . . for 100 to 700 kPa ±5 digits . . . . . for 0 to 100 kPa ±(0.2% of rdg + 0.1% of F.S.). . . . . for -80 to 0 kPa 4) For 3000 kPa class Accuracy: ±(0.02% of rdg + 10 digits). . . . . for 0 to 3000 kPa ±(0.2% of rdg + 0.1% of F.S.). . . . . for -80 to 0 kPa 5) For 130 kPa abs class Accuracy: ±(0.03% of rdg + 6 digits). . . . . for 0 to 130 kPa abs	Select a manometer having a pressure range close to that of the transmitter.
Pressure generator	Model 7674 pneumatic pressure standard for 200 kPa {2 kgf/cm^2}, 25 kPa {2500 mmH$_2$O} Accuracy: ±0.05% of F.S.	Requires air pressure supply.
	Dead weight gauge tester 25 kPa {2500 mmH$_2$O} Accuracy: ±0.03% of setting	Select the one having a pressure range close to that of the transmitter.
Pressure source	Model 6919 pressure regulator (pressure pump) Pressure range: 0 to 133 kPa {1000 mmHg}	Prepare the vacuum pump for negative pressure ranges.

Note: The above table contains the instruments capable of performing calibration to the 0.2% level. Since special maintenance and management procedures involving traceability of each instrument to higher-level standards are required for calibration to the 0.1% or higher level, there may be difficulties in calibration to this level in the field. For calibration to the 0.1% level, contact Yokogawa representatives from which the instrument was purchased or the nearest Yokogawa office.

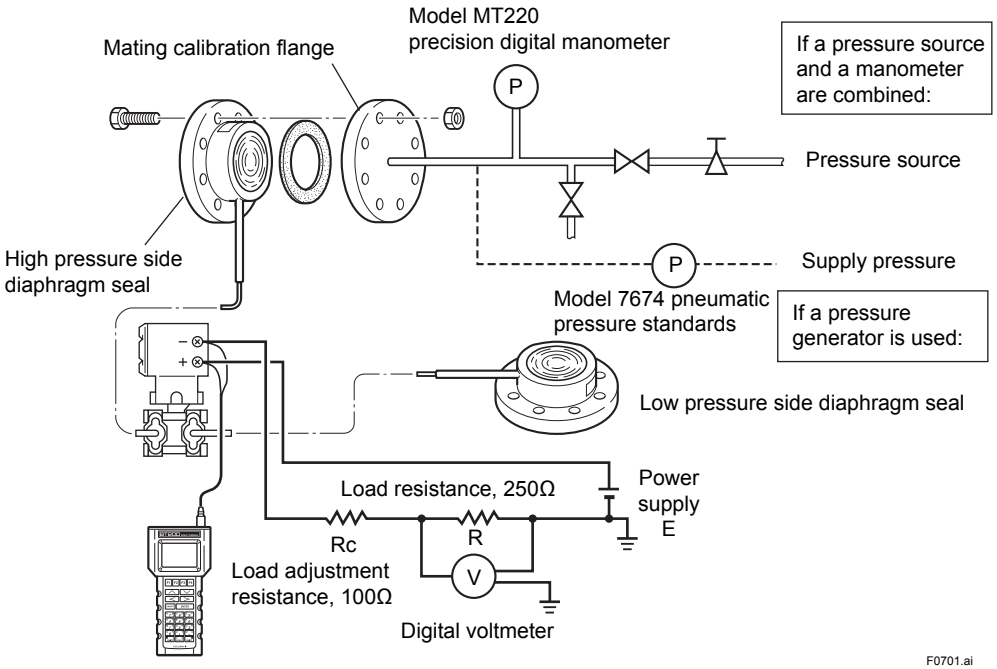


Figure 7.1 Instrument Connections

7.4 Disassembly and Reassembly

This section describes procedures for disassembly and reassembly for maintenance and component replacement.

Always turn OFF power and shut off and release pressures before disassembly. Use proper tools for all operations. Table 7.2 shows the tools required.

Table 7.2 Tools for Disassembly and Reassembly

Tool	Quantity	Remarks
Phillips screwdriver	1	JIS B4633, No. 2
Slotted screwdriver	1	
Allen wrenches	3	JIS B4648 One each, nominal 3, 4 and 2.5 mm Allen wrenches
Wrench	1	Width across flats, 17 mm
Torque wrench	1	
Adjustable wrench	1	
Socket wrench	1	Width across flats, 16 mm
Socket driver	1	Width across flats, 5.5 mm
Tweezers	1	

CAUTION

Precautions for ATEX Flameproof Type Transmitters

- Flameproof type transmitters must be, as a rule, removed to a non-hazardous area for maintenance and be disassembled and reassembled to the original state.
- On the flameproof type transmitters the two covers are locked, each by an Allen head bolt (shrouding bolt). When a shrouding bolt is driven clockwise by an Allen wrench, it is going in and cover lock is released, and then the cover can be opened.
  When a cover is closed it should be locked by a shrouding bolt without fail. Tighten the shrouding bolt to a torque of 0.7 N·m {7 kgf·cm}.

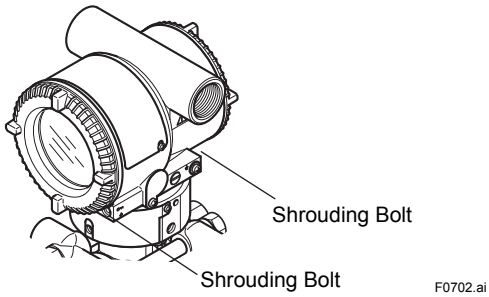


Figure 7.2 Shrouding Bolts

7.4.1 Replacing the Integral Indicator

CAUTION

Cautions for Flameproof Type Transmitters

Users are prohibited by law from modifying the construction of a flameproof type transmitter. This would invalidate the agency approval for the use of the transmitter in a rated area.
It follows that the user is prohibited from using a flameproof type transmitter with its integral indicator removed, or from adding an integral indicator to a transmitter. If such modification is absolutely required, contact Yokogawa.

This subsection describes the procedure for replacing an integral indicator. (See figure 7.3)

■ Removing the Integral Indicator

1) Remove the cover.
2) While supporting the integral indicator with one hand, loosen its two mounting screws.
3) Dismount the LCD board assembly from the CPU assembly.
   When doing this, carefully pull the LCD board assembly straight forward so as not to damage the connector pins between it and the CPU assembly.

■ Attaching the Integral Indicator

1) Align both the LCD board assembly and CPU assembly connectors and engage them.
2) Insert and tighten the two mounting screws.
3) Replace the cover.

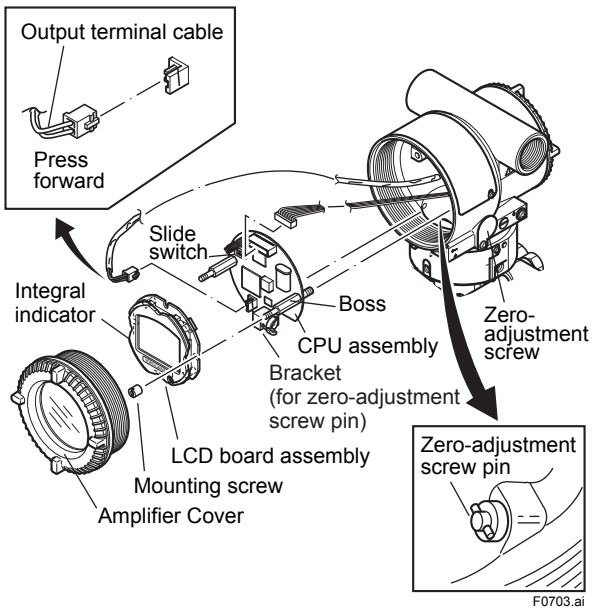


Figure 7.3 Removing and Attaching LCD Board Assembly and CPU Assembly

7.4.2 Replacing the CPU Board Assembly

This subsection describes the procedure for replacing the CPU assembly. (See figure 7.3)

■ **Removing the CPU Assembly**

1) Remove the cover. If an integral indicator is mounted, refer to subsection 7.4.1 and remove the indicator.
2) Turn the zero-adjustment screw to the position (where the screw head slot is horizontal) as shown in figure 7.3.
3) Disconnect the output terminal cable (cable with brown connector at the end). When doing this, lightly press the side of the CPU assembly connector and pull the cable connector to disengage.
4) Use a socket driver (width across flats, 5.5mm) to loosen the two bosses.
5) Carefully pull the CPU assembly straight forward to remove it.
6) Disconnect the flat cable (cable with white connector at the end) that connects the CPU assembly and the capsule.

NOTE

Be careful not to apply excessive force to the CPU assembly when removing it.

■ **Mounting the CPU Assembly**

1) Connect the flat cable (with white connector) between the CPU assembly and the capsule.
2) Connect the output terminal cable (with brown connector).

NOTE

Make certain that the cables do not get pinched between the case and the edge of the CPU assembly.

3) Align and engage the zero-adjustment screw pin with the groove on the bracket on the CPU assembly. Then insert the CPU board assembly straight onto the post in the amplifier case.
4) Tighten the two bosses. If the transmitter is equipped with an integral indicator, refer to subsection 7.4.1 to mount the indicator.

NOTE

Confirm that the zero-adjustment screw pin is placed properly in the groove on the bracket prior to tightening the two bosses. If it is not, the zero-adjustment mechanism will be damaged.

5) Replace the cover.

7.5 Troubleshooting

If any abnormality appears in the measured values, use the troubleshooting flow chart below to isolate and remedy the problem. Since some problems have complex causes, these flow charts may not identify all. If you have difficulty isolating or correcting a problem, contact Yokogawa service personnel.

7.5.1 Basic Troubleshooting

First determine whether the process variable is actually abnormal or a problem exists in the measurement system.

If the problem is in the measurement system, isolate the problem and decide what corrective action to take.

This transmitter is equipped with a self-diagnostic function which will be useful in troubleshooting, and the transmitter equipped with an integral indicator will show an alarm code as a result of self-diagnosis.
See subsection 7.5.3 for the list of alarms.
See also each communication manual.

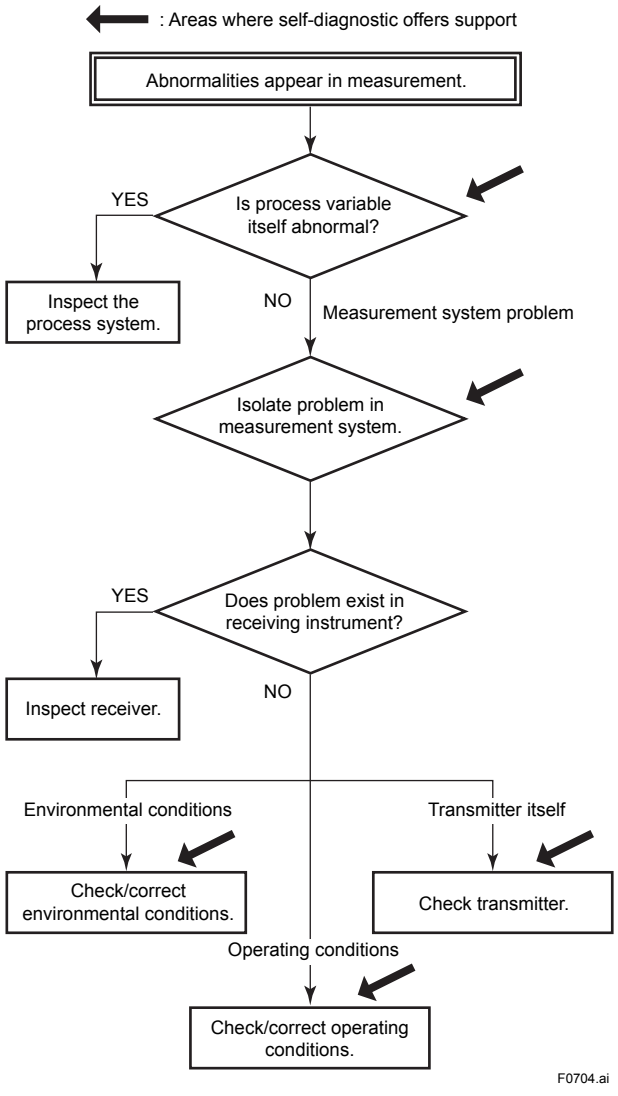
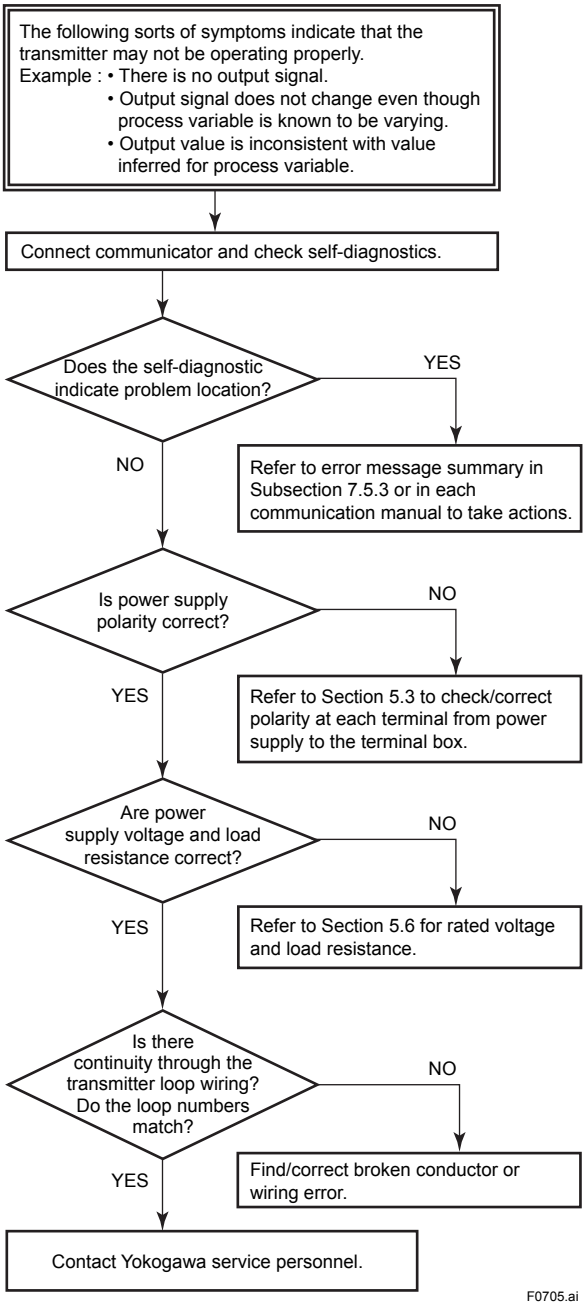


Figure 7.5 Basic Flow and Self-Diagnostics

7.5.2 Troubleshooting Flowcharts


The following sorts of symptoms indicate that the transmitter may not be operating properly.
Example : • There is no output signal.
• Output signal does not change even though process variable is known to be varying.
• Output value is inconsistent with value inferred for process variable.
Connect communicator and check self-diagnostics.
Does the self-diagnostic indicate problem location?
YES
Refer to error message summary in Subsection 7.5.3 or in each communication manual to take actions.
NO
Is power supply polarity correct?
NO
Refer to Section 5.3 to check/correct polarity at each terminal from power supply to the terminal box.
YES
Are power supply voltage and load resistance correct?
NO
Refer to Section 5.6 for rated voltage and load resistance.
YES
Is there continuity through the transmitter loop wiring? Do the loop numbers match?
NO
Find/correct broken conductor or wiring error.
YES
Contact Yokogawa service personnel.
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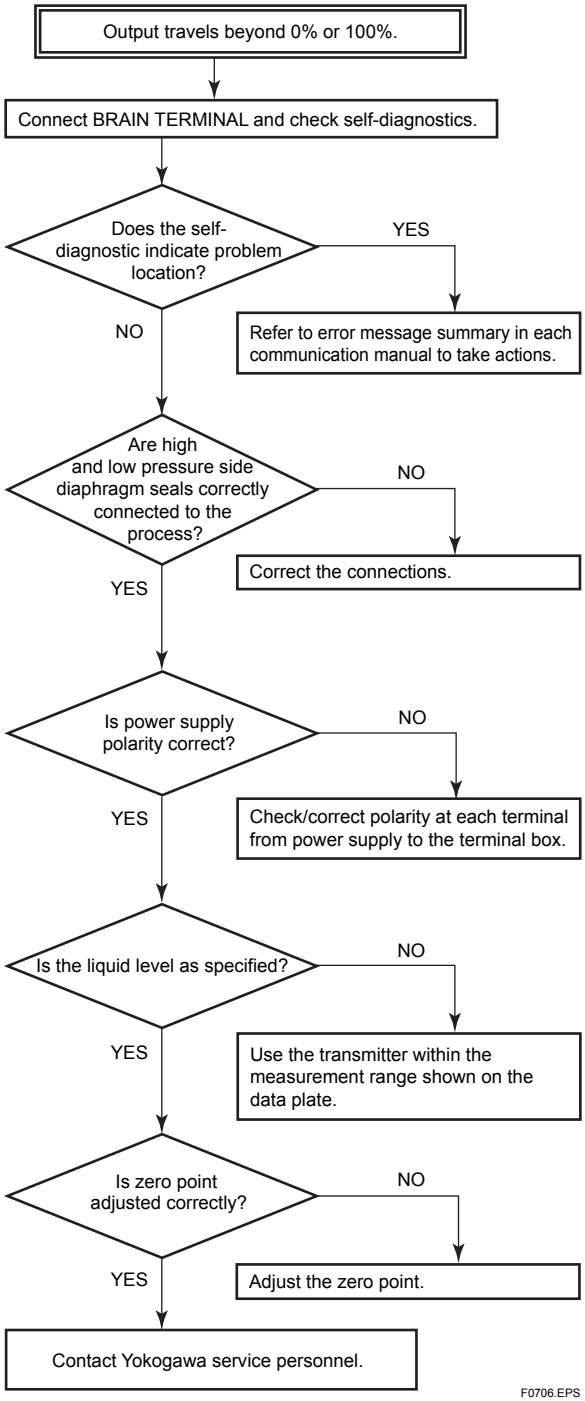
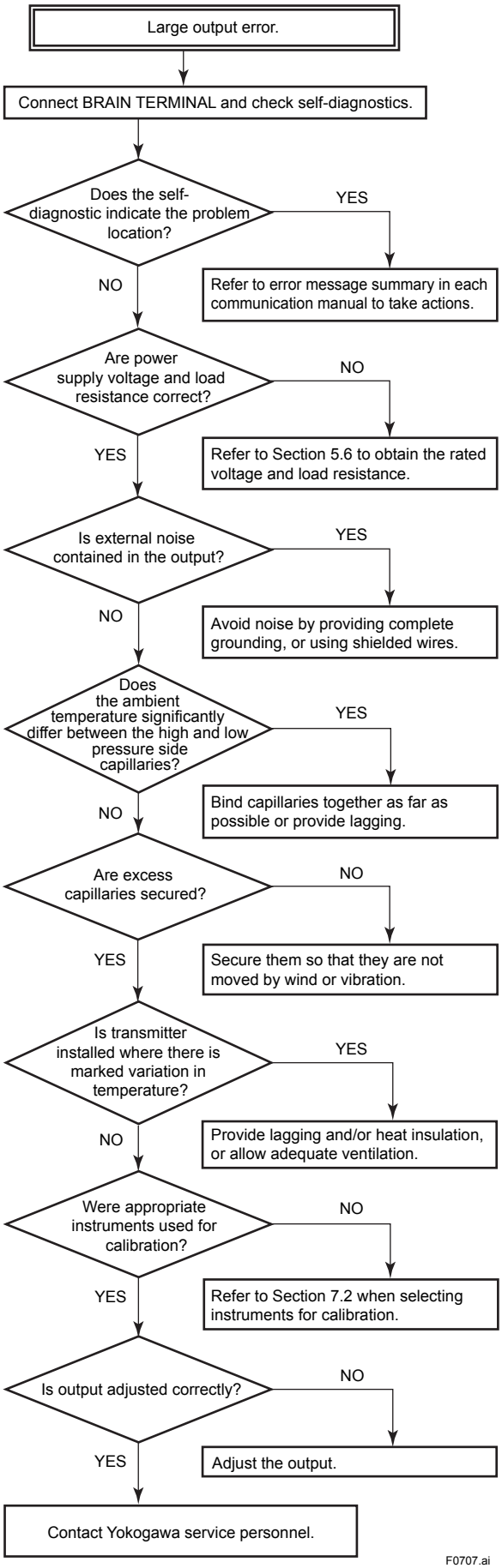

Output travels beyond 0% or 100%.
Connect BRAIN TERMINAL and check self-diagnostics.
Does the self-diagnostic indicate problem location?
YES
Refer to error message summary in each communication manual to take actions.
NO
Are high and low pressure side diaphragm seals correctly connected to the process?
NO
Correct the connections.
YES
Is power supply polarity correct?
NO
Check/correct polarity at each terminal from power supply to the terminal box.
YES
Is the liquid level as specified?
NO
Use the transmitter within the measurement range shown on the data plate.
YES
Is zero point adjusted correctly?
NO
Adjust the zero point.
YES
Contact Yokogawa service personnel.
F0706.EPS


Large output error.
Connect BRAIN TERMINAL and check self-diagnostics.
Does the self-diagnostic indicate the problem location?
YES
Refer to error message summary in each communication manual to take actions.
NO
Are power supply voltage and load resistance correct?
NO
Refer to Section 5.6 to obtain the rated voltage and load resistance.
YES
Is external noise contained in the output?
YES
Avoid noise by providing complete grounding, or using shielded wires.
NO
Does the ambient temperature significantly differ between the high and low pressure side capillaries?
YES
Bind capillaries together as far as possible or provide lagging.
NO
Are excess capillaries secured?
NO
Secure them so that they are not moved by wind or vibration.
YES
Is transmitter installed where there is marked variation in temperature?
YES
Provide lagging and/or heat insulation, or allow adequate ventilation.
NO
Were appropriate instruments used for calibration?
NO
Refer to Section 7.2 when selecting instruments for calibration.
YES
Is output adjusted correctly?
NO
Adjust the output.
YES
Contact Yokogawa service personnel.
F0707.ai

7.5.3 Alarms and Countermeasures

Table 7.3 Alarm Message Summary

Indicator	Cause	Output Operation during Error	Countermeasure
None			
AL. 01 CAP. ERR	Sensor problem.	Outputs the signal (Hold, High, or Low) set with parameter.	Replace capsule when error keeps appearing even after restart.
	Capsule temperature sensor problem.		
	Capsule EEPROM problem.		
AL. 02 AMP. ERR	Amplifier temperature sensor problem.	Outputs the signal (Hold, High, or Low) set with parameter.	Replace amplifier.
	Amplifier EEPROM problem.		
	Amplifier problem.		
AL. 10 PRESS	Input is outside measurement range limit of capsule.	Outputs high range limit value or low range limit value.	Check input or replace capsule when necessary.
AL. 11 ST. PRSS	Static pressure exceeds limit.	Continues to operate and output.	
AL. 12 CAP. TMP	Capsule temperature is outside range (–50 to 130°C).		Use heat insulation or make lagging to keep temperature within range.
AL. 13 AMP. TMP	Amplifier temperature is outside range (–50 to 95°C)		
AL. 30 RANGE	Output is outside upper or lower range limit value.	Outputs high range limit value or low range limit value.	Check input and range setting, and change them as needed.
AL. 31 SP. RNG	Static pressure exceeds specified range.	Holds output immediately before error occurred.	
AL. 35 *1 P. HI	Input pressure exceeds specified threshold.	Continues to operate and output.	Check input.
AL. 36 *1 P. LO			
AL. 37 *1 SP. HI	Input static pressure exceeds specified threshold.		
AL. 38 *1 SP. LO			
AL. 39 *1 TMP. HI	Detected temperature exceeds specified threshold.		
AL. 40 *1 TMP. LO			
AL. 50 P. LRV	Specified value is outside of setting range.	Holds output immediately before error occurred.	Check setting and change them as needed.
AL. 51 P. URV			
AL. 52 P. SPN			
AL. 53 P. ADJ		Continues to operate and output.	Check input.
AL. 54 SP. RNG		Continues to operate and output holding static pressure in %.	Check setting and change them as needed.
AL. 55 SP. ADJ		Continues to operate and output.	Check input.
AL. 60 SC. CFG	Specified values or settings to define signal characterizer function do not satisfy the condition.		Check setting and change them as needed.
AL. 79 OV. DISP	Displayed value exceeds limit.		

*1: These alarms may appear only when process alarm function is activated.

8. General Specifications

8.1 Standard Specifications

Refer to IM 01C25T02-01E for FOUNDATION Fieldbus communication type marked with "◊".

● Performance Specifications

See General Specifications sheet, GS 01C25H01-01E and GS 01C25J03-01E.

● Functional Specifications

Span & Range Limits

EJX118A

Measurement Span/Range		kPa	inH2O(/D1)	mbar(/D3)	mmH2O(/D4)
M	Span	2 to 100	8 to 400	20 to 1000	200 to 10000
	Range	-100 to 100	-400 to 400	-1000 to 1000	-10000 to 10000
H	Span	10 to 500	40 to 2000	100 to 5000	0.1 to 5 kgf/cm^2
	Range	-500 to 500	-2000 to 2000	-5000 to 5000	-5 to 5 kgf/cm^2

EJX438A

Measurement Span/Range			MPa	psi(/D1)	bar(/D2)	kgf/cm^2 (/D3)
A*1		Span	0.035 to 3.5	5 to 500	0.35 to 35	0.35 to 35
		Range	-0.1 to 3.5	-14.5 to 500	-1 to 35	-1 to 35
B	Flush type*1	Span	0.16 to 16	23 to 2300	1.6 to 160	1.6 to 160
		Range	-0.1 to 16	-14.5 to 2300	-1 to 160	-1 to 160
	Extended type*1	Span	0.16 to 7	23 to 1000	1.6 to 70	1.6 to 70
		Range	-0.1 to 7	-14.5 to 1000	-1 to 70	-1 to 70

*1: Measurement range is within the flange rating.

Output "◊"

Two wire 4 to 20 mA DC output with digital communications, linear or square root programmable. BRAIN or HART FSK protocol are superimposed on the 4 to 20 mA signal.
Output range: 3.6 mA to 21.6 mA
Output limits conform to NAMUR NE43 can be pre-set by option C2 or C3.

Failure Alarm

Output status at CPU failure and hardware error;
Up-scale: 110%, 21.6 mA DC or more (standard)
Down-scale: –5%, 3.2 mA DC or less
Note: Applicable for Output signal code D and E

Damping Time Constant (1st order)

Amplifier damping time constant is adjustable from 0 to 100.00 seconds and added to response time.

Note: For BRAIN protocol type, when amplifier damping is set to less than 0.5 seconds, communication may occasionally be unavailable during the operation, especially while output changes dynamically. The default setting of damping ensures stable communication.

Update Period "◊"

Differential Pressure: 45 msec
Static Pressure: 360 msec

Zero Adjustment Limits

Zero can be fully elevated or suppressed, within the lower and upper range limits of the capsule.

External Zero Adjustment "◊"

External Zero is continuously adjustable with 0.01% incremental resolution of span. Re-range can be done locally using the digital indicator with range-setting switch.

Integral Indicator (LCD display)

5-digit Numerical Display, 6-digit Unit Display and Bar graph.
The indicator is configurable to display one or up to four of the following variables periodically.; Differential pressure in %, Scaled Differential pressure, Differential Pressure in Engineering unit, Static Pressure in Engineering unit.
See "Setting When Shipped" for factory setting.

● Normal Operating Condition
(Selected features may affect limits.)

Ambient Temperature Limits

–40 to 60°C (–40 to 140°F)
–30 to 60°C (–22 to 140°F) with LCD display

Note: The ambient temperature limits must be within the fill fluid operating temperature range, see table 8.1.

Process Temperature Limits

See table 8.1.

Ambient Humidity Limits

0 to 100% RH

Working Pressure Limits

See table 8.1.
For atmospheric pressure or below, see figure 8.1 and 8.2.

Table 8.1 Process temperature, Ambient temperature, and Working pressure

	Code	Process temperature*1	Ambient temperature*2	Working pressure	Specific gravity*3
Silicone oil (general use)	A	–10 to 250°C (14 to 482°F)*4	–10 to 60°C (14 to 140°F)	2.7 kPa abs (0.38 psi abs) to flange rating pressure*5	1.07
Silicone oil (general use)	B	–30 to 180°C (–22 to 356°F)	–15 to 60°C (–5 to 140°F)		0.94
Silicone oil (high temperature use)	C	10 to 310°C (50 to 590°F)	10 to 60°C (50 to 140°F)		1.09
Fluorinated oil (oil-prohibited use)	D	–20 to 120°C (–4 to 248°F)	–10 to 60°C (14 to 140°F)	51 kPa abs (7.4 psi abs) to flange rating pressure*5	1.90 to 1.92
Ethylene glycol (low temperature use)	E	–50 to 100°C (–58 to 212 °F)	–40 to 60°C (–40 to 140°F)	100 kPa abs (atmospheric pressure) to flange rating pressure*5	1.09

*1: See figure 8.1 and 8.2 'Working Pressure and Process Temperature.'
*2: This ambient temperature is the transmitter ambient temperature.
*3: Approximate values at a temperature of 25°C (77°F)
*4: In case of wetted parts material code TW (Tantalum), process temperature limit is up to 200°C (392°F).
*5: Maximum measurement range value for EJX438W. The working pressure must be within the flange rating pressure.
Note: The differential pressure transmitter should be installed at least 600 mm below the high pressure (HP) process connection. However, this value (600 mm) may be affected by ambient temperature, operating pressure, fill fluid or material of the wetted diaphragm.
Contact YOKOGAWA when the transmitter can not be installed at least 600 mm below the HP process connection.

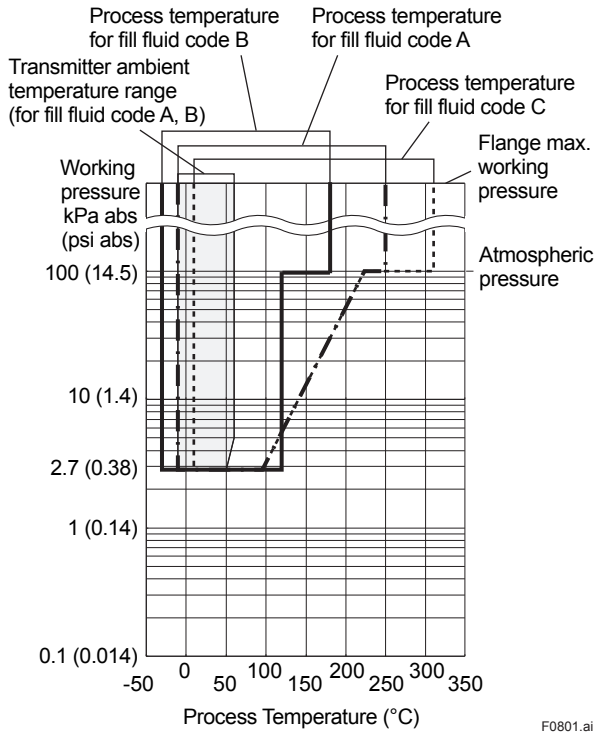


Figure 8.1 Working Pressure and Process Temperature (Fill fluid: silicone oil for general and high temperature use)

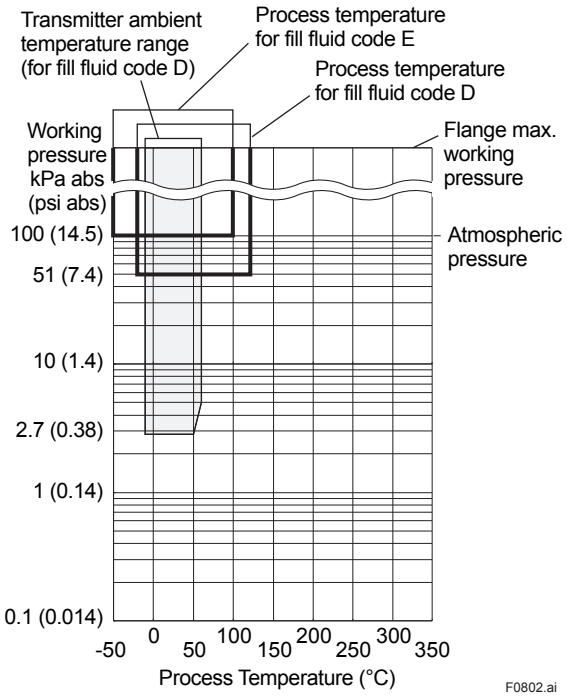


Figure 8.2 Working Pressure and Process Temperature (Fill fluid: fluorinated oil for oil-prohibited use and ethylene glycol for low temperature use)

Supply & Load Requirements "◊"

(Optional features or approval codes may affect electrical requirements.)

With 24 V DC supply, up to a 550 Ω load can be used. See graph below.

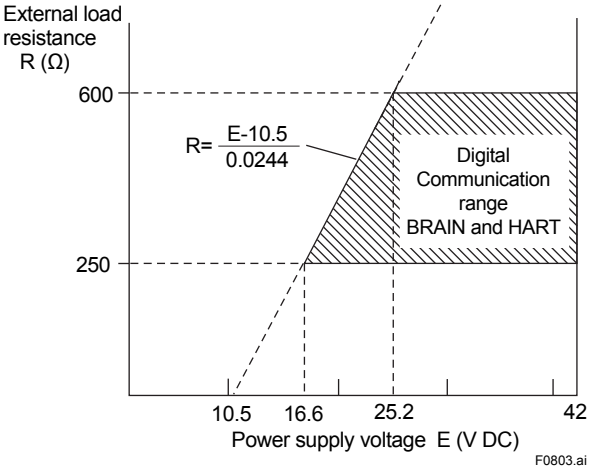


Figure 8.3 Relationship Between Power Supply Voltage and External Load Resistance

Supply Voltage

10.5 to 42 V DC for general use and flameproof type.

10.5 to 32 V DC for lightning protector (Option code /A).

10.5 to 30 V DC for intrinsically safe, type n or non-incendive type.

Minimum voltage limited at 16.6 V DC for digital communications, BRAIN and HART

Load (Output signal code D and E)

0 to 1290 Ω for operation

250 to 600 Ω for digital communication

Communication Requirements "◊"

(Safety approvals may affect electrical requirements.)

BRAIN

Communication Distance

Up to 2 km (1.25 miles) when using CEV polyethylene-insulated PVC-sheathed cables. Communication distance varies depending on type of cable used.

Load Capacitance

0.22 μF or less

Load Inductance

3.3 mH or less

Input Impedance of communicating device

10 kΩ or more at 2.4 kHz.

HART

Communication Distance

Up to 1.5 km {1 mile} when using multiple twisted pair cables. Communication distance varies depending on type of cable used.

Use the following formula to determine cable length for specific applications:

$$L = \frac{65 \times 10^6}{(R \times C)} - \frac{(C_f + 10{,}000)}{C}$$

Where:

L = length in meters or feet

R = resistance in Ω (including barrier resistance)

C = cable capacitance in pF/m or pF/ft

C_f = maximum shunt capacitance of receiving devices in pF/m or pF/ft

EMC Conformity Standards CE , N200

EN61326-1 Class A, Table2 (For use in industrial locations)

EN61326-2-3

● Physical Specifications

Process connections

See the following table.

Table 8.2 Flange size and rating

Process connection style	Size	Flange
Flush type	3-inch 2-inch 1 1/2-inch*1	JIS 10K, 20K, 40K, 63K*2 ANSI Class 150, 300, 600 JPI Class 150, 300, 600 DIN PN10/16, 25/40, 64
Extended type	4-inch 3-inch	JIS 10K, 20K, 40K*2 ANSI Class 150, 300 JPI Class 150, 300 DIN PN10/16, 25/40
Combination type*3 (Extended and Flush)	High pressure side: 4-inch Low pressure side: 3-inch	JIS 10K, 20K ANSI Class 150, 300 JPI Class 150, 300 DIN PN10/16, 25/40

*1: Flushing connection rings are always attached.
*2: Applicable for EJX438A only.
*3: Applicable for EJX118A only.

Gasket Contact Surface

See the following table.

Table 8.3 Gasket contact surface

Flange		JIS/JPI/DIN		ANSI	
Wetted parts material code		SW SE SY	HW TW UW	SW SE SY	HW TW UW
Gasket contact Surface	Serration*1	—	—	●	—
	Flat (No serration)	●	●	●	●

●: Applicable, —: Not applicable
*1: ANSI B16.5

Electrical Connections
See “Model and Suffix Codes.”

Transmitter Mounting
2-inch pipe mounting

Wetted Parts Material
Diaphragm seal
Diaphragm and other wetted parts;
Refer to “Model And Suffix Codes.”

Flushing connection ring (optional)
Ring and Vent / Drain plugs
Refer to “Model And Suffix Codes.”
(Spiral) gasket for transmitter side
316SST (Hoop), PTFE Teflon (Filler)

Non-wetted Parts Material
Transmitter body section:
Cover flange
ASTM CF-8M
Cover flange bolting
ASTM-B7 carbon steel, 316L SST stainless steel, or ASTM grade 660 stainless steel
Housing
Low copper cast aluminum alloy with polyurethane, mintgreen paint (Munsell 5.6BG 3.3/2.9 or its equivalent) or ASTM CF-8M stainless steel.

Cover O-rings
Buna-N, fluoro-rubber (option)
Degrees of Protection
IP67, NEMA4X, JIS C0920
Name plate and tag
304 SST or 316 SST (optional)
Diaphragm seal section:
Process Flange
JIS S25C, 304 SST, or 316 SST
Capillary tube
316 SST
Protection tube
304 SST PVC-sheathed
(Max. operating temperature of PVC,100°C (212°F))
Fill fluid
See table 8.1.

Weight

EJX118A
Flush type: 16.2 kg (35.7 lbs)
(3-inch ANSI Class150 flange, capillary length 5 m; without integral indicator and mounting bracket.)
Extended type: 21.8 kg (48.1 lbs)
(4-inch ANSI Class150 flange, extention length (X_2)=100 mm, capillary length 5 m; without integral indicator and mounting bracket.)
Combination type: 19.0 kg (41.7 lbs)
(4-inch and 3-inch ANSI Class150 flange, extention length (X_2) =100 mm, capillary length 5 m; without integral indicator and mounting bracket.)

EJX438A
Flush type: 7.2 kg (15.9 lbs)
(3-inch ANSI Class150 flange, capillary length 5 m; without integral indicator and mounting bracket.)
Extended type: 12.3 kg (27.1 lbs)
(4-inch ANSI Class150 flange, extention length (X_2)=100 mm, capillary length 5 m; without integral indicator and mounting bracket.)

Add 1.5 kg (3.3lb) for amplifier housing code 2.

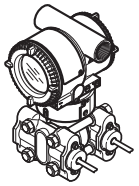
8.2 Model and Suffix Codes

● Instruction

The model and suffix codes for EJX118A and EJX438A consist of two parts; a transmitter body section (I) and a diaphragm seal section (II). This specification sheet introduces these two parts separately. The transmitter body section is shown in one table, and the diaphragm seal section specifications are listed according to the process connection style. First select the model and suffix codes of transmitter body section and then continue on one of the diaphragm seal section.

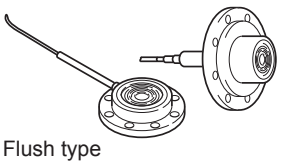
EJX118A
EJX438A – □□□□□–□□□□□–□□□□□□□□–□□□□

I Transmitter body section | II Diaphragm seal section



See Page 8-5

See Page 8-6



Flush type
Flange size: 80A, 50A • • • See Page 8-7
Flange size: 40A • • • See Page 8-8
Extended type • • • See Page 8-9
Combination type • • • See Page 8-10

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EJX118A

I. Transmitter body section

EJX118A – □□□□□ – □□□□□ – □□□□□□□□ – □□□□

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Model	Suffix codes	Description
EJX118A	. . . . .	Diaphragm sealed differential pressure transmitter
Output signal	**-D** ·	4 to 20 mA DC with digital communication (BRAIN protocol)
	-E ·	4 to 20 mA DC with digital communication (HART protocol)
	-F ·	Digital communication (FOUNDATION Fieldbus protocol)
Measurement span (capsule)	**M** ·	2 to 100 kPa (8 to 400 inH_2O)
	H ·	10 to 500 kPa (40 to 2000 inH_2O)
—	**S** ·	Always S
—	**C** ·	Always C
Coverflange bolts and nuts material	**J** ·	ASTM-B7 carbon steel
	G ·	316L SST stainless steel
	C ·	ASTM grade660 stainless steel
Installation	**-9** ·	Horizontal piping type and left side high pressure
Amplifier housing	**1** ·	Cast-aluminum alloy
	2 ·	ASTM CF-8M Stainless steel*2
Electrical connection	**0** ·	G 1/2 female, one electrical connection without blind plugs
	► **2** ·	1/2 NPT female, two electrical connections without blind plugs
	4 ·	M20 female, two electrical connections without blind plugs
	5 ·	G 1/2 female, two electrical connections with a blind plug
	7 ·	1/2 NPT female, two electrical connections with a blind plug
	9 ·	M20 female, two electrical connections with a blind plug
	A ·	G 1/2 female, two electrical connections and a 316 SST blind plug
	C ·	1/2 NPT female, two electrical connections and a 316 SST blind plug
	D ·	M20 female, two electrical connections and a 316 SST blind plug
Integral Indicator	**D** ·	Digital indicator
	E ·	Digital indicator with the range setting switch *1
	► **N** ·	None
Mounting blaket	**B** ·	304 SST 2-inch pipe mounting, flat type (for horizontal piping)
	J ·	316 SST 2-inch pipe mounting, flat type (for horizontal piping)
	► **N** ·	None
Diaphragm seal section		–□□□□□□□□–□□□□ Continued on diaphragm seal section (II)

The "►" marks indicate the most typical selection for each specification.
*1: Not applicable for output signal code F.
*2: Not applicable for electrical connection code 0.

EJX438A

I. Transmitter body section

EJX438A – □□□□□ – □□□□□ – □□□□□□□□ – □□□□

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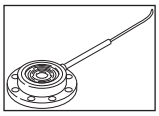
Model	Suffix codes	Description
EJX438A	· · · · · · · · · · · · · · · · · · · ·	Diaphragm sealed gauge pressure transmitter
Output signal	**-D** ·	4 to 20 mA DC with digital communication (BRAIN protocol)
	-E ·	4 to 20 mA DC with digital communication (HART protocol)
	-F ·	Digital communication (FOUNDATION Fieldbus protocol)
Measurement span (capsule)	**A** ·	0.035 to 3.5 MPa (5 to 500 psi)
	B ·	0.16 to 16 MPa (23 to 2300 psi)*1
—	**S** ·	Always S
—	**C** ·	Always C
Coverflange bolts and nuts material	**J** ·	ASTM-B7 carbon steel
	G ·	316L SST stainless steel
	C ·	ASTM grade660 stainless steel
Installation	**-9** ·	Horizontal piping type and left side high pressure
Amplifier housing	**1** ·	Cast-aluminum alloy
	2 ·	ASTM CF-8M Stainless steel*3
Electrical connection	**0** ·	G 1/2 female, one electrical connection without blind plugs
►	**2** ·	1/2 NPT female, two electrical connections without blind plugs
	4 ·	M20 female, two electrical connections without blind plugs
	5 ·	G 1/2 female, two electrical connections with a blind plug
	7 ·	1/2 NPT female, two electrical connections with a blind plug
	9 ·	M20 female, two electrical connections with a blind plug
	A ·	G 1/2 female, two electrical connections and a 316 SST blind plug
	C ·	1/2 NPT female, two electrical connections and a 316 SST blind plug
	D ·	M20 female, two electrical connections and a 316 SST blind plug
Integral Indicator	**D** ·	Digital indicator
	E ·	Digital indicator with the range setting switch *2
►	**N** ·	None
Mounting braket	**B** ·	304 SST 2-inch pipe mounting, flat type (for horizontal piping)
	J ·	316 SST 2-inch pipe mounting, flat type (for horizontal piping)
►	**N** ·	None
Diaphragm seal section		–□□□□□□□□–□□□□ Continued on diaphragm seal section (II)

The "►" marks indicate the most typical selection for each specification.
*1: When specified process connection style code E, maximum range and span are 7 MPa (1000 psi.)
*2: Not applicable for output signal code F.
*3: Not applicable for electrical connection code 0, 5, 7 and 9.

II. Diaphragm seal section (Flush type)

● Process connection size: 3-inch (80 mm) / 2-inch (50 mm)

EJX118A
EJX438A – □□□□□ – □□□□□ – W□ 3 2 □□□□□□ – □□□□



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Model	Suffix codes	Description	EJX118A	EJX438A
EJX118A EJX438A	–□□□□□–□□□□□ · · · · · · · · · · · · · · · · · ·	Transmitter body section (I)		
Process connection style	-W · · · · · · · · · · · · · · · · · ·	Flush type		
Flange rating	J1 · · · · · · · · · · · · · · · · · ·	JIS 10K	○	○
	J2 · · · · · · · · · · · · · · · · · ·	JIS 20K	○	○
	J4 · · · · · · · · · · · · · · · · · ·	JIS 40K	○	○
	J6 · · · · · · · · · · · · · · · · · ·	JIS 63K	—	○
	A1 · · · · · · · · · · · · · · · · · ·	ANSI class 150 P1 . . . . . JPI class 150	○	○
	A2 · · · · · · · · · · · · · · · · · ·	ANSI class 300 P2 . . . . . JPI class 300	○	○
	A4 · · · · · · · · · · · · · · · · · ·	ANSI class 600 P4 . . . . . JPI class 600	○	○
	D2 · · · · · · · · · · · · · · · · · ·	DIN PN10/16	○	○
	D4 · · · · · · · · · · · · · · · · · ·	DIN PN25/40	○	○
	D5 · · · · · · · · · · · · · · · · · ·	DIN PN64	○	○
Process connection size (Process flange size)	3 · · · · · · · · · · · · · · · · · ·	3-inch (80 mm)	○	○
	2 · · · · · · · · · · · · · · · · · ·	2-inch (50 mm)	○	○
Flange material	A · · · · · · · · · · · · · · · · · ·	JIS S25C	○	○
►	B · · · · · · · · · · · · · · · · · ·	304 SST*10	○	○
	C · · · · · · · · · · · · · · · · · ·	316 SST*10	○	○
Gasket contact surface *1	1 · · · · · · · · · · · · · · · · · ·	Serration (for ANSI flange with wetted parts material SW only)	○	○
	2 · · · · · · · · · · · · · · · · · ·	Flat (no serration)	○	○
Wetted parts material		[Diaphragm] [Others]		
	SW · · · · · · · · · · · · · · · · · ·	316L SST # 316L SST #	○	○
	HW · · · · · · · · · · · · · · · · · ·	Hastelloy C-276*9 # Hastelloy C-276*9 #	○	○
	TW · · · · · · · · · · · · · · · · · ·	Tantalum Tantalum	○	○
	UW · · · · · · · · · · · · · · · · · ·	Titanium Titanium	○	○
Flushing connection ring *2		[Ring] [Drain/Vent plugs] [Material]		
►	0 · · · · · · · · · · · · · · · · · ·	None — —	○	○
	1 · · · · · · · · · · · · · · · · · ·	Straight type R 1/4 connections*8 JIS SUS316 #	○	—
	2 · · · · · · · · · · · · · · · · · ·	Straight type 1/4 NPT connections JIS SUS316 #	○	—
	A · · · · · · · · · · · · · · · · · ·	Straight type R 1/4 connections*8 JIS SUS316 #	—	○
	B · · · · · · · · · · · · · · · · · ·	Straight type 1/4 NPT connections JIS SUS316 #	—	○
Extension	0 · · · · · · · · · · · · · · · · · ·	None	○	○
Fill fluid		[Process temp.] [Ambient temp.]		
	-A · · · · · · · · · · · · · · · · · ·	For general use (Silicone oil)*3 –10 to 250°C –10 to 60°C	○	○
►	-B · · · · · · · · · · · · · · · · · ·	For general use (Silicone oil) –30 to 180°C –15 to 60°C	○	○
	-C · · · · · · · · · · · · · · · · · ·	For high temperature use (silicone oil)*4*7 10 to 310°C 10 to 60°C	○	○
	-D · · · · · · · · · · · · · · · · · ·	For oil-prohibited use (fluorinated oil)*5 –20 to 120°C –10 to 60°C	○	○
	-E · · · · · · · · · · · · · · · · · ·	For low temperature use (ethylene glycol) –50 to 100°C –40 to 60°C	○	○
Capillary connection	A · · · · · · · · · · · · · · · · · ·	Side of diaphragm seal unit	○	○
—	2 · · · · · · · · · · · · · · · · · ·	Always 2	○	○
Capillary length*6	1 · ·	1 m 6 . . . . . 6 m	○	○
	2 · ·	2 m 7 . . . . . 7 m	○	○
	3 · ·	3 m 8 . . . . . 8 m	○	○
	4 · ·	4 m 9 . . . . . 9 m	○	○
	5 · ·	5 m A . . . . . 10 m	○	○
Option codes		/□ Optional specification		

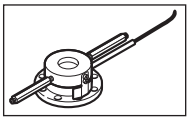
The "►" marks indicate the most typical selection for each specification. Example: EJX118A-DMSCG-912EN-WA13B1SW00-BA25/□

*1: See table 8.2 ‘Gasket contact surface’ on page 8-3.
*2: When specified flushing connection ring code 1, 2, A, or B, exclusive gasket is provided for transmitter side.
*3: In case of wetted parts material code TW (Tantalum), the process temperature limit is –10 to 200°C.
*4: Wetted parts material code TW (Tantalum) cannot be applied.
*5: Even in case where fill fluid code D (fluorinated oil) is selected, if degrease cleansing treatment or both degrease cleansing and dehydrating treatment for the wetted parts is required, specify option code K1 or K5.
*6: In case of wetted parts material code HW (Hastelloy C), TW (Tantalum), and UW (Titanuym) for 2-inch pressure flange, specify capillary length from 1 to 5 m.
*7: Flushing connection ring code 1, 2, A, or B cannot be applied.
*8: Not applicable for gasket contact surface code 1.
*9: Hastelloy C-276 or N10276.
*10: Forged version of the material may be used.
The “#” marks indicate the construction materials conform to NACE material recommendations per MR01-75. For the use of 316 SST material, there may be certain limitations for pressure and temperature. Please refer to NACE standards for details.

II. Diaphragm seal section (Flush type)

● Process connection size: 1 1/2-inch (40 mm)

EJX118A
EJX438A – □□□□□ – □□□□□ – W□ 8 □□□□□ – □□□□



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Model	Suffix codes	Description	EJX118A	EJX438A
EJX118A EJX438A	–□□□□□–□□□□□	Transmitter body section (I)		
Process connection style	-W	Flush type		
Flange rating	J1	JIS 10K	○	○
	J2	JIS 20K	○	○
	J4	JIS 40K	○	○
	A1	ANSI class 150 P1 . . . . . JPI class 150	○	○
	A2	ANSI class 300 P2 . . . . . JPI class 300	○	○
	A4	ANSI class 600 P4 . . . . . JPI class 600	○	○
Process connection size (Process flange size)	8	1 1/2-inch (40 mm)	○	○
Flange material	► A	JIS S25C	○	○
	► B	304 SST*5	○	○
	► C	316 SST*5	○	○
Gasket contact surface *1	1	Serration (for ANSI flange only)	○	○
	2	Flat (no serration)	○	○
Wetted parts material	SW	[Diaphragm] 316L SST # / [Others] 316L SST #	○	○
Flushing connection ring *2		[Ring] [Drain/Vent plugs] [Material]		
	3	Reducer type R 1/4 connections*4 316 SST #	○	—
	4	Reducer type 1/4 NPT connections 316 SST #	○	—
	C	Reducer type R 1/4 connections*4 316 SST #	—	○
	D	Reducer type 1/4 NPT connections 316 SST #	—	○
Extension	0	None	○	○
Fill fluid		[Process temp.] [Ambient temp.]		
	-A	For general use (Silicone oil) –10 to 250°C –10 to 60°C	○	○
	► -B	For general use (Silicone oil) –30 to 180°C –15 to 60°C	○	○
	-D	For oil-prohibited use (fluorinated oil)*3 –20 to 120°C –10 to 60°C	○	○
	-E	For low temperature use (ethylene glycol) –50 to 100°C –40 to 60°C	○	○
Capillary connection	A	Side of diaphragm seal unit	○	○
—	2	Always 2	○	○
Capillary length	1	1 m	○	○
	2	2 m	○	○
	3	3 m	○	○
	4	4 m	○	○
	5	5 m	○	○
	6	6 m	○	○
	7	7 m	○	○
	8	8 m	○	○
	9	9 m	○	○
	A	10 m	○	○
Option codes		/□ Optional specification		

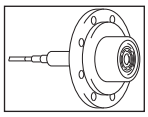
The "►" marks indicate the most typical selection for each specification. Example: EJX118A-DMSCG-912EN-WA18B1SW40-BA25/□
EJX438A-DAS2G-912EN-WA18B1SWD0-BA25/□

*1: See table 8.2 'Gasket contact surface' on page 8-3.
*2: When specified flushing connection ring code 3, 4, C, or D, exclusive gasket is provided for transmitter side.
*3: Even in case where fill fluid code D (fluorinated oil) is selected, if degrease cleansing treatment or both degrease cleansing and dehydrating treatment for the wetted parts is required, specify option code K1 or K5.
*4: Not applicable for gasket contact surface code 1.
*5: Forged version of the material may be used.
The "#" marks indicate the construction materials conform to NACE material recommendations per MR01-75. For the use of 316 SST material, there may be certain limitations for pressure and temperature. Please refer to NACE standards for details.

II. Diaphragm seal section (Extended type)

● Process connection size: 4-inch (100 mm) / 3-inch (80 mm)

EJX118A
EJX438A – □□□□□ – □□□□□ – E □ 4 3 □□□□□ – □□□□



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Model	Suffix codes	Description	EJX118A	EJX438A
EJX118A EJX438A	–□□□□□–□□□□□ · · · · · · · · · · · · · · · · · ·	Transmitter body section (I)		
Process connection style	**-E** · · · · · · · · · · · · · · · · · ·	Extended type		
Flange rating	**J1** · · · · · · · · · · · · · · · · · ·	JIS 10K	○	○
	J2 · · · · · · · · · · · · · · · · · ·	JIS 20K	○	○
	J4 · · · · · · · · · · · · · · · · · ·	JIS 40K	—	○
	A1 · · · · · · · · · · · · · · · · · ·	ANSI class 150 **P1** . . . . . JPI class 150	○	○
	A2 · · · · · · · · · · · · · · · · · ·	ANSI class 300 **P2** . . . . . JPI class 300	○	○
	D2 · · · · · · · · · · · · · · · · · ·	DIN PN10/16	○	○
	D4 · · · · · · · · · · · · · · · · · ·	DIN PN25/40	○	○
Process connection size (Process flange size)	**4** · · · · · · · · · · · · · · · · · ·	4-inch (100 mm)	○	○
	3 · · · · · · · · · · · · · · · · · ·	3-inch (80 mm)	○	○
Flange material	**A** · · · · · · · · · · · · · · · · · ·	JIS S25C	○	○
►	**B** · · · · · · · · · · · · · · · · · ·	304 SST*4	○	○
	C · · · · · · · · · · · · · · · · · ·	316 SST*4	○	○
Gasket contact surface *1	**1** · · · · · · · · · · · · · · · · · ·	Serration (for ANSI flange only)	○	○
	2 · · · · · · · · · · · · · · · · · ·	Flat (no serration)	○	○
Wetted parts material	**SE** · · · · · · · · · · · · · · · · · ·	[Diaphragm] [Pipe] [Others] 316L SST # 316 SST # 316 SST #	○	○
Flushing connection ring	**0** · · · · · · · · · · · · · · · · · ·	None	○	○
Extension	**1** · · · · · · · · · · · · · · · · · ·	Length (X2) = 50 mm	—	○
	2 · · · · · · · · · · · · · · · · · ·	Length (X2) = 50 mm	○	—
	3 · · · · · · · · · · · · · · · · · ·	Length (X2) = 100 mm	—	○
	4 · · · · · · · · · · · · · · · · · ·	Length (X2) = 100 mm	○	—
	5 · · · · · · · · · · · · · · · · · ·	Length (X2) = 150 mm	—	○
	6 · · · · · · · · · · · · · · · · · ·	Length (X2) = 150 mm	○	—
Fill fluid		[Process temp.] [Ambient temp.]		
	-A · · · · · ·	For general use (Silicone oil) –10 to 250°C –10 to 60°C	○	○
►	**-B** · · · · · ·	For general use (Silicone oil) –30 to 180°C –15 to 60°C	○	○
	-C · · · · · ·	For high temperature use (silicone oil) 10 to 310°C 10 to 60°C	○	○
	-D · · · · · ·	For oil-prohibited use (fluorinated oil)*2 –20 to 120°C –10 to 60°C	○	○
	-E · · · · · ·	For low temperature use (ethylene glycol) –50 to 100°C –40 to 60°C	○	○
Capillary connection	**B** · · · · · ·	Back of diaphragm seal unit	○	○
—	**2** · · ·	Always 2	○	○
Capillary length *3	**1** · ·	1 m	○	○
	2 · ·	2 m	○	○
	3 · ·	3 m	○	○
	4 · ·	4 m	○	○
	5 · ·	5 m	○	○
	6 · ·	6 m	○	○
	7 · ·	7 m	○	○
	8 · ·	8 m	○	○
	9 · ·	9 m	○	○
	A · ·	10 m	○	○
Option codes		/□ Optional specification		

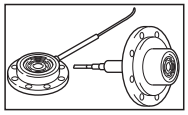
The "►" marks indicate the most typical selection for each specification. Example: EJX118A-DMSCG-912EN-EA14B1SE02-BB25/□
EJX438A-DASCG-912EN-EA14B1SE01-BB25/□

*1: See table 8.2 'Gasket contact surface' on page 8-3.
*2: Even in case where fill fluid code D (fluorinated oil) is selected, if degrease cleansing treatment or both degrease cleansing and dehydrating treatment for the wetted parts is required, specify option code K1 or K5.
*3: The specified capillary length includes the extension length (X2) and the flange thickness (t).
*4: Forged version of the material may be used.
The "#" marks indicate the construction materials conform to NACE material recommendations per MR01-75. For the use of 316 SST material, there may be certain limitations for pressure and temperature. Please refer to NACE standards for details.

II. Diaphragm seal section (Combination type)

● **Process connection size: Low pressure side; 4-inch (100 mm) · · · Extended type**
High pressue side; 3-inch (80 mm) · · · Flush type

EJX118A – □□□□□ – □□□□□ – **Y** ▭ **W** ▭▭▭▭ – ▭▭▭▭



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Model	Suffix codes	Description
EJX118A	–□□□□□–□□□□□ · · · · · · · · · · · · · · · · · ·	Transmitter body section (I)
Process connection style	**-Y** · · · · · · · · · · · · · · · · · ·	Combination type (Extended and Flush)
Flange rating	**J1** · · · · · · · · · · · · · · · · · ·	JIS 10K
	J2 · · · · · · · · · · · · · · · · · ·	JIS 20K
	A1 · · · · · · · · · · · · · · · · · ·	ANSI class 150 **P1** . . . . . JPI class 150
	A2 · · · · · · · · · · · · · · · · · ·	ANSI class 300 **P2** . . . . . JPI class 300
	D2 · · · · · · · · · · · · · · · · · ·	DIN PN10/16
	D4 · · · · · · · · · · · · · · · · · ·	DIN PN25/40
Process connection size (Process flange size)	**W** · · · · · · · · · · · · · · · · · ·	High pressure side 4-inch (100 mm) Low pressure side 3-inch (80 mm)
Flange material	► **A** · · · · · · · · · · · · · · · · · ·	JIS S25C
	► **B** · · · · · · · · · · · · · · · · · ·	304 SST*4
	► **C** · · · · · · · · · · · · · · · · · ·	316 SST*4
Gasket contact surface *1	**1** · · · · · · · · · · · · · · · · · ·	Serration (for ANSI flange only)
	2 · · · · · · · · · · · · · · · · · ·	Flat (no serration)
Wetted parts material	**SY** · · · · · · · · · · · · · · · · · ·	[Diaphragm] [Pipe] [Others] High pressure side: 316L SST # 316 SST # 316 SST # Low pressure side: 316L SST # — 316L SST #
Flushing connection ring	**0** · · · · · · · · · · · · · · · · · ·	None
Extension	**1** · · · · · · · · · · · · · · · · · ·	Length (X2) = 50 mm
	3 · · · · · · · · · · · · · · · · · ·	Length (X2) = 100 mm
	5 · · · · · · · · · · · · · · · · · ·	Length (X2) = 150 mm
Fill fluid	**-A** · · · · · · · · · · · · · · · · · ·	[Process temp.] [Ambient temp.] For general use (Silicone oil) –10 to 250°C –10 to 60°C
	► **-B** · · · · · · · · · · · · · · · · · ·	For general use (Silicone oil) –30 to 180°C –15 to 60°C
	-C · · · · · · · · · · · · · · · · · ·	For high temperature use (silicone oil) 10 to 310°C 10 to 60°C
	-D · · · · · · · · · · · · · · · · · ·	For oil-prohibited use (fluorinated oil)*2 –20 to 120°C –10 to 60°C
	-E · · · · · · · · · · · · · · · · · ·	For low temperature use (ethylene glycol) –50 to 100°C –40 to 60°C
Capillary connection	**C** · · · · · · · · · · · · · · · · · ·	High pressure side: Back of diaphragm seal unit Low pressure side: Side of diaphragm seal unit
—	**2** · · · · · · · · · · · · · · · · · ·	Always 2
Capillary length *3	**1** · · · · · · · · · · · · · · · · · ·	1 m
	2 · · · · · · · · · · · · · · · · · ·	2 m
	3 · · · · · · · · · · · · · · · · · ·	3 m
	4 · · · · · · · · · · · · · · · · · ·	4 m
	5 · · · · · · · · · · · · · · · · · ·	5 m
	6 · · · · · · · · · · · · · · · · · ·	6 m
	7 · · · · · · · · · · · · · · · · · ·	7 m
	8 · · · · · · · · · · · · · · · · · ·	8 m
	9 · · · · · · · · · · · · · · · · · ·	9 m
	A · · · · · · · · · · · · · · · · · ·	10 m
Option codes	/□ Optional specification	

The "►" marks indicate the most typical selection for each specification. Example: EJX118A-DMSCG-912EN-YA1WB1SY01-BC25/□

*1: See table 8.2 'Gasket contact surface' on page 8-3.

*2: Even in case where fill fluid code D (fluorinated oil) is selected, if degrease cleansing treatment or both degrease cleansing and dehydrating treatment for the wetted parts is required, specify option code K1 or K5.

*3: The specified capillary length of high pressure side (extended side) includes the extension length (X2) and the flange thickness (t).

*4: Forged version of the material may be used.

The "#" marks indicate the construction materials conform to NACE material recommendations per MR01-75. For the use of 316 SST material, there may be certain limitations for pressure and temperature. Please refer to NACE standards for details.

8.3 Optional Specifications (For Explosion Protected type) "◊"

Item		Description	Code
Factory Mutual (FM)		FM Explosionproof Approval *1 Explosionproof for Class I, Division 1, Groups B, C and D Dust-ignitionproof for Class II/III, Division 1, Groups E, F and G Hazardous (classified) locations, indoors and outdoors (NEMA 4X)	**FF1**
		FM Intrinsically safe Approval *1*3 Intrinsically Safe for Class I, Division 1, Groups A, B, C and D, Class II, Division 1,Groups E, F and G and Class III, Division 1 Hazardous Locations. Nonincendive for Class I, Division 2, Groups A, B, C and D, Class II, Division 2, Groups F and G, and Class III, Division 1 Hazardous Locations.	**FS1**
		Combined FF1 and FS1 *1*3	**FU1**
CENELEC ATEX		CENELEC ATEX (KEMA) Flameproof Approval *1 II 2G EExd IIC T4, T5, T6	**KF21**
		CENELEC ATEX (KEMA) Intrinsically safe Approval *1*3 II 1G EEx ia IIC T4	**KS2**
		Combined KF21, KS2 and Type n *1*3 Type n: II 3G EEx nL IIC T4	**KU21**
Canadian Standards Association (CSA)		CSA Explosionproof Approval *1 [For CSA C22.2] Explosionproof for Class I, Division 1, Groups B, C and D Dustignitionproof for Class II/III, Division 1, Groups E, F and G [For CSA E60079] Flameproof for Zone1, Ex d IIC T6...T4 Enclosure IP66 and IP67 Process Sealing Certification Dual Seal Certified by CSA to the requirement of ANSI/ISA 12.27.01 No additional sealing required Primary seal failure annunciation: at the zero adjustment screw	**CF1**
		CSA Intrinsically safe Approval *1 *3 [For CSA C22.2] Intrinsically safe for Class I, Division 1, Groups A, B, C and D, Class II, Division 1, Groups E,F and G, Class III, Division 1 Nonincendive for Class I, Division 2, Groups A, B, C and D, Class II, Division 2, Groups E,F and G, Class III, Division 1 [For CSA E60079] Ex ia IIC T4, Ex nL IIC T4 Process Sealing Certification Dual Seal Certified by CSA to the requirement of ANSI/ISA 12.27.01 No additional sealing required Primary seal failure annunciation: at the zero adjustment screw	**CS1**
		Combined CF1 and CS1 *1*3	**CU1**
IECEx Scheme		IECEx flameproof Approval *1 Flameproof for Zone1, Ex d IIC T6...T4	**SF2**
		IECEx Intrinsically safe, type n and flameproof Approval *1*3 Intrinsically safe and type n Ex ia IIC T4, Ex nL IIC T4 Flameproof Flameproof for Zone1, Ex d IIC T6...T4	**SU2**
Combined Approvals		Combination of /KU21, /FU1 and /CU1 *1*3	**V1U**
Painting	Color change	Amplifier cover only	**P□**
		Amplifier cover and terminal cover, Munsell 7.5 R4/14	**PR**
	Coating change	Anti-corrosion coating*4	**X2**
316 SST exterior parts		316 SST name plate, tag plate and zero adjustment screw	**HC**
Fluoro-rubber O-ring		All O-rings of amplifier housing. Lower limit of ambient temperature: -15°C (5°F)	**HE**
Lightning protector		Transmitter power supply voltage: 10.5 to 32 V DC (10.5 to 30 V DC for intrinsically safe type.) Allowable current: Max. 6000 A (1×40 µs), Repeating 1000 A (1×40 µs) 100 times Applicable Standards: IEC 61000-4-4, IEC 61000-4-5	**A**
Status output *12		Transistor output (open drain: sink type) Contact rating: 10.5 to 30 V DC, 120 mA DC (max) Low level: 0 to 2 V DC	**AL**
Oil-prohibited use		Degrease cleansing treatment.	**K1**

Item	Description		Code
Oil-prohibited use with dehydrating treatment	Degrease cleansing and dehydrating treatment.		K5
Calibration units *6	P calibration (psi unit)	(See Table for Span and Range Limits.)	D1
	bar calibration (bar unit)		D3
	M calibration (kgf/cm^2 unit)		D4
Teflon film *5 *11	Diaphragm protection from sticky process fluid by FEP Teflon film attached with fluorinated oil. Operation range: 20 to 150°C, 0 to 2 MPa (Not applicable for vacuum service).		TF1
Operating temperature correction *8	Adjusting range: 80°C to Maximum temperature of specified fill fluid		R
Capillary without PVC sheaths	When ambient temperature exceeds 100°C, or use of PVC is prohibited		V
Output limits and failure operation *7	Failure alarm down-scale: Output status at CPU failure and hardware error is –5%, 3.2 mA DC or less.		C1
	NAMUR NE43 Compliant Output signal limits: 3.8 mA to 20.5 mA	Failure alarm down-scale: Output status at CPU failure and hardware error is –5%, 3.2 mA DC or less.	C2
		Failure alarm up-scale: Output status at CPU failure and hardware error is 110%, 21.6 mA or more.	C3
Gold-plate *9	Inside of isolating diaphragms (fill fluid side) are gold plated, effective for hydrogen permeation.		A1
Stainless steel tag plate	304SST tag plate wired onto transmitter		N4
Data configuration at factory *10	Data configuration for HART communication type	Software damping, Descriptor, Message	CA
	Data configuration for BRAIN communication type	Software damping	CB
Advanced diagnostics *13	Multi-sensing process monitoring • Impulse line blockage detection *14		DG6
Material certificate	Process flange, Block	For Flush type	M2W
	Process flange, Block, Ring *15		M5W
	Process flange, Block, Pipe, Base	For Extended type	M2E
	High Pressure side: Process flange, Block, Pipe, Base Low Pressure side: Process flange, Block	For Combination type	M2Y

Pressure test/Leak test Certificate *19			(Flange rating)	(Test pressure)		
	EJX118A		JIS 10K	2 MPa (290 psi)	Nitrogen (N$_2$) Gas *18 Retention time: 10 minutes	T51
			JIS 20K	5 MPa (720 psi)		T54
			JIS 40K *16	10 MPa (1450 psi)		T57
			ANSI/JPI Class 150	3 MPa (430 psi)		T52
			ANSI/JPI Class 300 *16	8 MPa (1160 psi)		T56
			ANSI/JPI Class 300 *17	7 MPa (1000 psi)		T55
			ANSI/KPI Class 600 *16	16 MPa (2300 psi)		T58
	EJX438A	For A-Capsule	JIS 10K	2 MPa (290 psi)		T51
			JIS 20K, 40K, 63K	3.5 MPa (500 psi)		T53
			ANSI/JPI Class 150, 300, 600	3.5 MPa (500 psi)		T53
		For B-Capsule	JIS 10K	2 MPa (290 psi)		T51
			JIS 20K	5 MPa (720 psi)		T54
			JIS 40K *16	10 MPa (1450 psi)		T57
			JIS 40K *17	7 MPa (1000 psi)		T55
			JIS 63K *16	16 MPa (2300 psi)		T58
			ANSI/JPI Class 150	3 MPa (435 psi)		T52
			ANSI/JPI Class 300 *16	8 MPa (1160 psi)		T56
			ANSI/JPI Class 300 *17	7 MPa (1000 psi)		T55
			ANSI/JPI Class 600 *16	16 MPa (2300 psi)		T58

Contact Yokogawa representative for the codes indicated as '-'.
*1: Applicable for Electrical connection code 2, 4, 7, and 9.
*2: Applicable for Electrical connection code 2 and 7.
*3: Not applicable for option code /AL.
*4: Not applicable with color change option.
*5: Applicable for flush type (process connection style code W.)
*6: The unit of MWP (Max. working pressure) on the name plate of a housing is the same unit as specified by option code D1, D3, and D4.

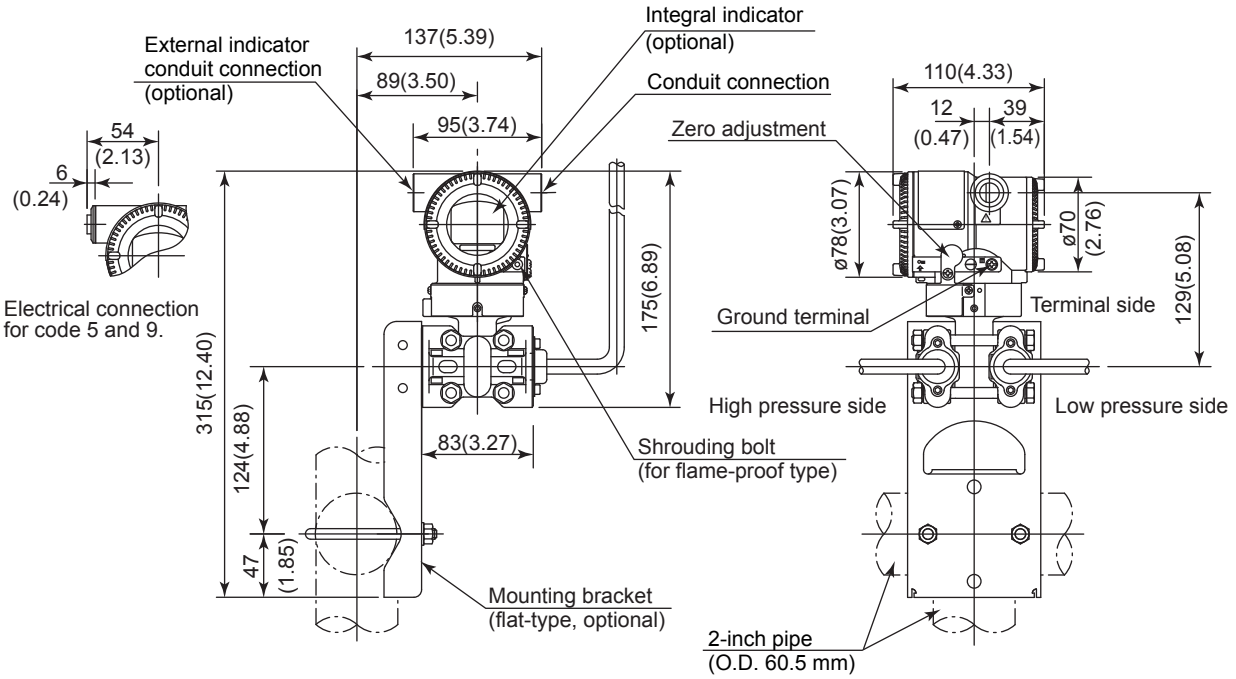
*7: Applicable for output signal code D and E. The hardware error indicates faulty amplifier or capsule.
*8: Specify the process operating temperature for zero correction. Example: Zero correction by process temperature 90°C.
*9: Applicable for wetted parts material code SW, SE, SY, and HW.
*10: Also see 'Ordering Information.'
*11: Applicable for flushing connection ring code 0.
*12: Check terminals cannot be used when this option is specified. Not applicable for output signal code F and amplifier housing code 2.
*13: Applicable only for output signal code -E.
*14: The change of pressure fluctuation is monitored and then detects the impulse line blockage. See TI 01C25A31-01E for detailed technical information required for using this function.
*15: Applicable for flushing connection ring code 1, 2, 3, 4, A, B, C, and D.
*16: Applicable for flush type (process connection style code W.)
*17: Applicable for extended type and Combination type (process connection style code E and Y.)
*18: Pure nitrogen gas is used for oil-prohibited use (option code K1and K5.)
*19: The unit on the certificate is always MPa regardless of selection of option code D1, D3, or D4. A flushing connection ring will not be applied when conducting the pressure test or leak test.

8.4 Dimensions

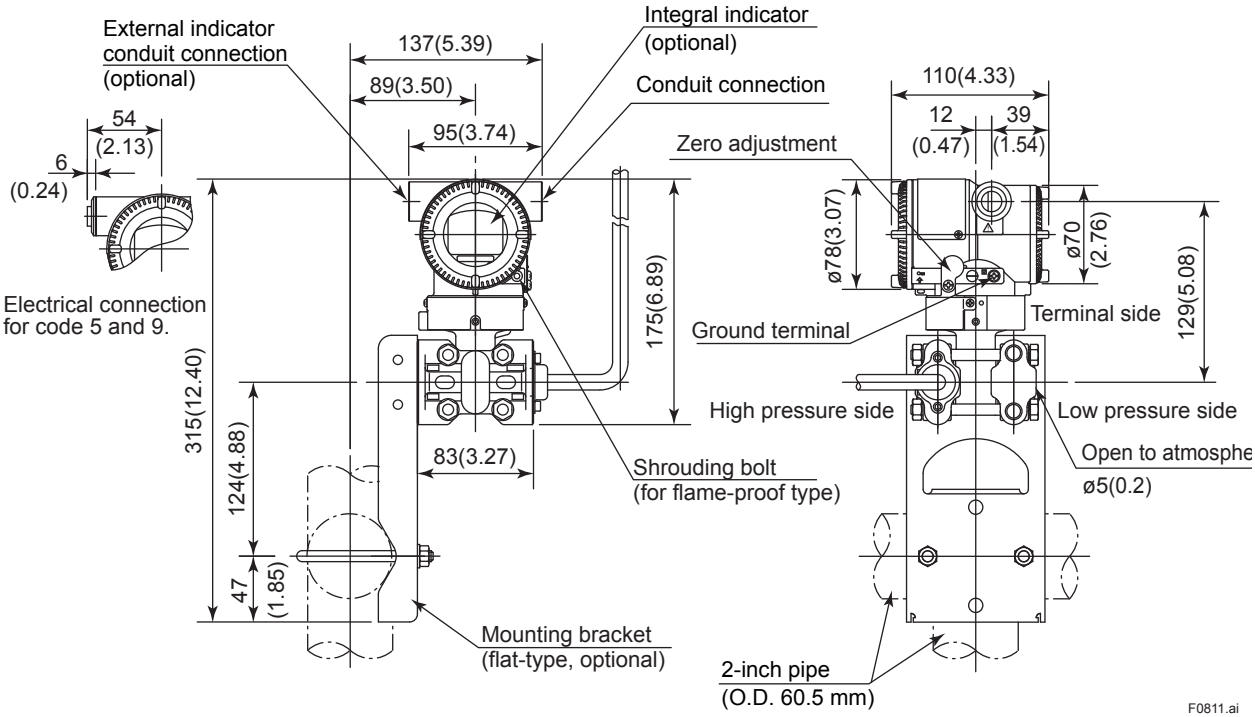
● Transmitter body section

Unit: mm (Approx.: inch)

EJX118A



EJX438A

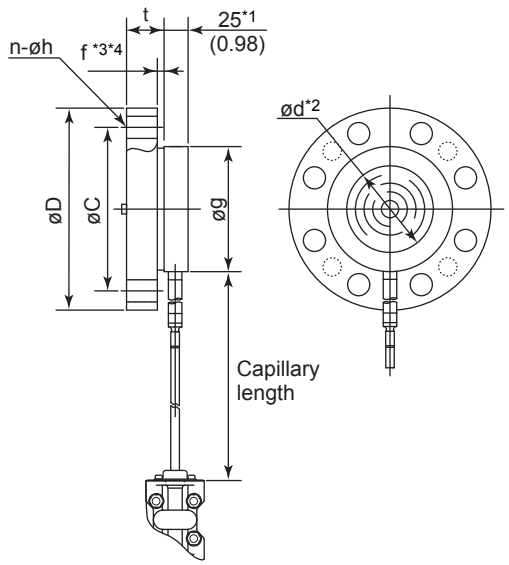


< Diaphragm seal section >

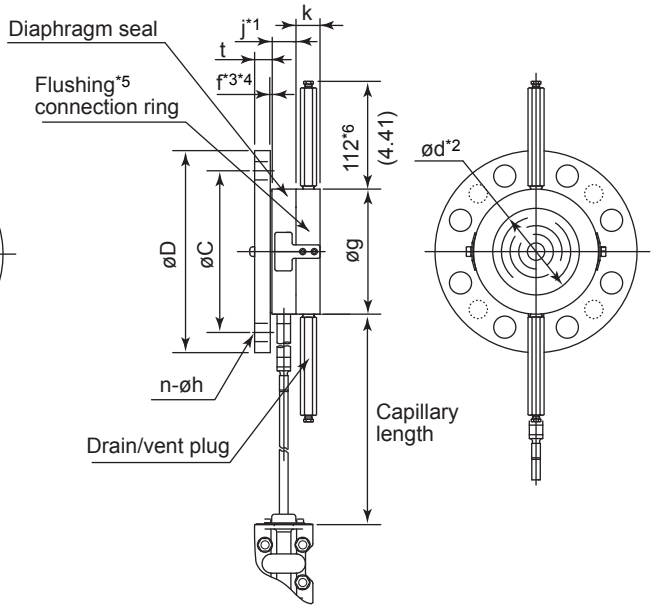
● Flush type

Unit: mm (Approx.: inch)

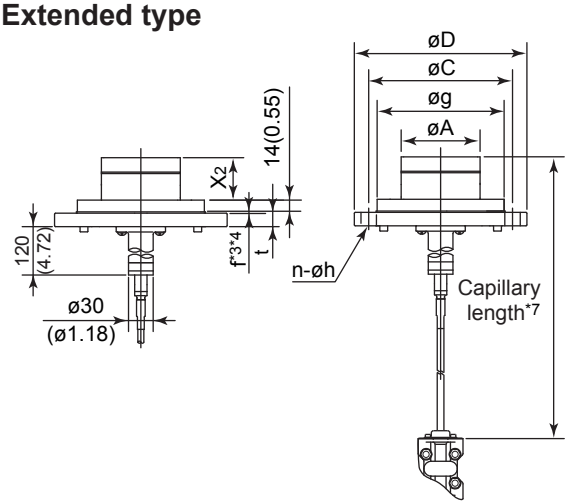
• No ring (flushing connection ring code 0)



• With ring (flushing connection ring code 1, 2, 3, 4, A, B, C and D)

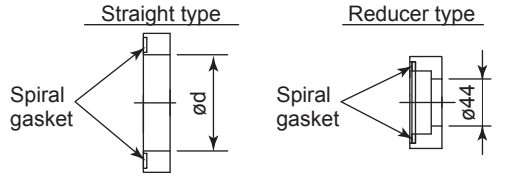


● Extended type



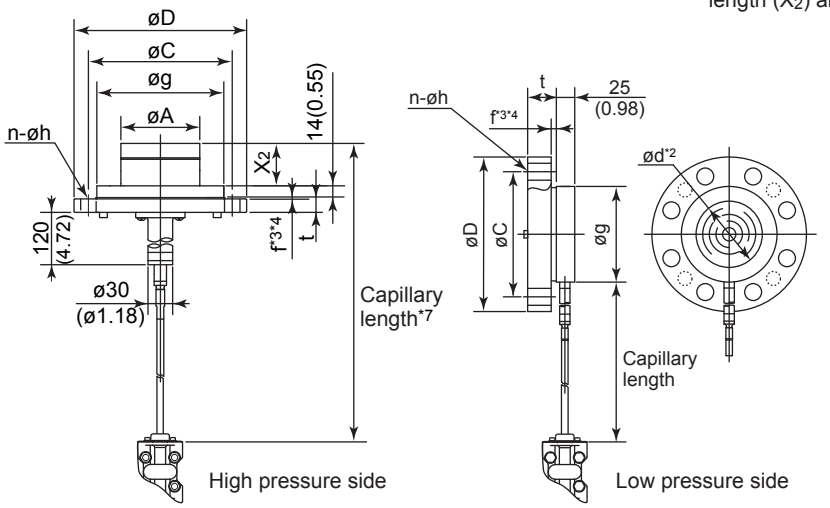
*1: When wetted parts material code **UW** (titanium), value is 34 (1.34)
*2: Indicates inside diameter of gasket contact surface
*3: In case where process flange material is JIS S25C, value of f is 0.
*4: In case where process flange material is JIS SUS304 in ANSI/JPI flange, value of f is included in t.

*5: Flushing connection ring



*6: When option code **K1** or **K5** is selected, add 11 mm (0.28 inch.)
*7: The specified capillary length includes the extension length (X_2) and the flange thickness (t).

● Combination type



Extension length (X_2)

Extension code	X_2
1, 2	50(1.97)
3, 4	100(3.94)
5, 6	150(5.91)

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Unit: mm (Approx.: inch)

Process flange size: 4 inch (100 mm)

Code	Flange rating	øD	øC	øg	ød	t	f*3*4	Bolt holes		j	k	øA
								No.(n)	Dia.(øh)			
J1	JIS 10K	210(8.27)	175(6.89)	155(6.10)	—	18(0.71)	0	8	19(0.75)	—	—	96±0.5(3.78±0.02)
J2	JIS 20K	225(8.86)	185(7.28)	155(6.10)	—	24(0.94)	0	8	23(0.91)	—	—	96±0.5(3.78±0.02)
J4	JIS 40K	250(9.84)	205(8.07)	155(6.10)	—	36(1.42)	0	8	25(0.98)	—	—	96±0.5(3.78±0.02)
A1	ANSI class 150	228.6(9.00)	190.5(7.50)	155(6.10)	—	23.9(0.94)	1.6(0.06)	8	19.1(0.75)	—	—	96±0.5(3.78±0.02)
A2	ANSI class 300	254(10.00)	200.2(7.88)	155(6.10)	—	31.8(1.25)	1.6(0.06)	8	22.4(0.88)	—	—	96±0.5(3.78±0.02)
P1	JPI class 150	229(9.02)	190.5(7.50)	155(6.10)	—	24(0.94)	1.6(0.06)	8	19(0.75)	—	—	96±0.5(3.78±0.02)
P2	JPI class 300	254(10.0)	200.2(7.88)	155(6.10)	—	32(1.26)	1.6(0.06)	8	22(0.87)	—	—	96±0.5(3.78±0.02)
D2	DIN PN10/16	220(8.66)	180(7.09)	155(6.10)	—	20(0.79)	0	8	18(0.71)	—	—	96±0.5(3.78±0.02)
D4	DIN PN25/40	235(9.25)	190(7.48)	155(6.10)	—	24(0.94)	0	8	22(0.87)	—	—	96±0.5(3.78±0.02)

Process flange size: 3 inch (80 mm)

Code	Flange rating	øD	øC	øg	ød*2	t	f*3*4	Bolt holes		j*1	k	øA
								No.(n)	Dia.(øh)			
J1	JIS 10K	185(7.28)	150(5.91)	130(5.12)	90(3.54)	18(0.71)	0	8	19(0.75)	25(0.98)	27(1.06)	71±0.5(2.8±0.02)
J2	JIS 20K	200(7.87)	160(6.30)	130(5.12)	90(3.54)	22(0.87)	0	8	23(0.91)	25(0.98)	27(1.06)	71±0.5(2.8±0.02)
J4	JIS 40K	210(8.27)	170(6.69)	130(5.12)	90(3.54)	32(1.26)	0	8	23(0.91)	25(0.98)	27(1.06)	—
J6	JIS 63K	230(9.06)	185(7.28)	130(5.12)	90(3.54)	40(1.57)	0	8	25(0.98)	25(0.98)	27(1.06)	71±0.5(2.8±0.02)
A1	ANSI class 150	190.5(7.50)	152.4(6.00)	130(5.12)	90(3.54)	23.9(0.94)	1.6(0.06)	4	19.1(0.75)	25(0.98)	27(1.06)	71±0.5(2.8±0.02)
A2	ANSI class 300	209.6(8.25)	168.1(6.62)	130(5.12)	90(3.54)	28.5(1.12)	1.6(0.06)	8	22.4(0.88)	25(0.98)	27(1.06)	71±0.5(2.8±0.02)
A4	ANSI class 600	209.6(8.25)	168.1(6.62)	130(5.12)	90(3.54)	38.2(1.50)	6.4(0.25)	8	22.4(0.88)	25(0.98)	27(1.06)	—
P1	JPI class 150	190(7.48)	152.4(6.00)	130(5.12)	90(3.54)	24(0.94)	1.6(0.06)	4	19(0.75)	25(0.98)	27(1.06)	71±0.5(2.8±0.02)
P2	JPI class 300	210(8.27)	168.1(6.61)	130(5.12)	90(3.54)	28.5(1.12)	1.6(0.06)	8	22(0.87)	25(0.98)	27(1.06)	71±0.5(2.8±0.02)
P4	JPI class 600	210(8.27)	168.1(6.61)	130(5.12)	90(3.54)	38.4(1.51)	6.4(0.25)	8	22(0.87)	25(0.98)	27(1.06)	—
D2	DIN PN10/16	200(7.87)	160(6.30)	130(5.12)	90(3.54)	20(0.79)	0	8	18(0.71)	25(0.98)	27(1.06)	71±0.5(2.8±0.02)
D4	DIN PN25/40	200(7.87)	160(6.30)	130(5.12)	90(3.54)	24(0.94)	0	8	18(0.71)	25(0.98)	27(1.06)	71±0.5(2.8±0.02)
D5	DIN PN64	215(8.46)	170(6.69)	130(5.12)	90(3.54)	28(1.10)	0	8	22(0.87)	25(0.98)	27(1.06)	—

Process flange size: 2 inch (50 mm)

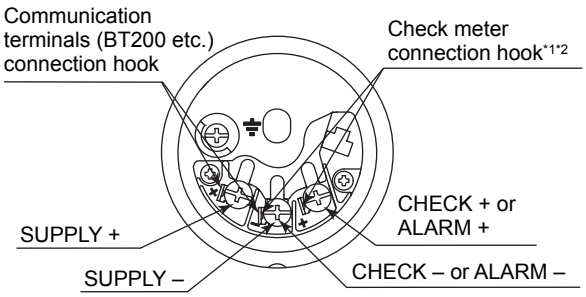
Code	Flange rating	øD	øC	øg	ød*2	t	f*3*4	Bolt holes		j*1	k
								No.(n)	Dia.(øh)		
J1	JIS 10K	155(6.10)	120(4.72)	100(3.94)	61(2.40)	16(0.63)	0	4	19(0.75)	25(0.98)	27(1.06)
J2	JIS 20K	155(6.10)	120(4.72)	100(3.94)	61(2.40)	18(0.71)	0	8	19(0.75)	25(0.98)	27(1.06)
J4	JIS 40K	165(6.50)	130(5.12)	100(3.94)	61(2.40)	26(1.02)	0	8	19(0.75)	25(0.98)	27(1.06)
J6	JIS 63K	185(7.28)	145(5.71)	100(3.94)	61(2.40)	34(1.34)	0	8	23(0.91)	25(0.98)	27(1.06)
A1	ANSI class 150	152.4(6.00)	120.7(4.75)	100(3.94)	61(2.40)	19.1(0.75)	1.6(0.06)	4	19.1(0.75)	25(0.98)	27(1.06)
A2	ANSI class 300	165.1(6.50)	127.0(5.00)	100(3.94)	61(2.40)	22.4(0.88)	1.6(0.06)	8	19.1(0.75)	25(0.98)	27(1.06)
A4	ANSI class 600	165.1(6.50)	127.0(5.00)	100(3.94)	61(2.40)	31.8(1.25)	6.4(0.25)	8	19.1(0.75)	25(0.98)	27(1.06)
P1	JPI class 150	152(5.98)	120.6(4.75)	100(3.94)	61(2.40)	19.5(0.77)	1.6(0.06)	4	19(0.75)	25(0.98)	27(1.06)
P2	JPI class 300	165(6.50)	127.0(5.00)	100(3.94)	61(2.40)	22.4(0.88)	1.6(0.06)	8	19(0.75)	25(0.98)	27(1.06)
P4	JPI class 600	165(6.50)	127.0(5.00)	100(3.94)	61(2.40)	31.9(1.26)	6.4(0.25)	8	19(0.75)	25(0.98)	27(1.06)
D2	DIN PN10/16	165(6.50)	125(4.92)	100(3.94)	61(2.40)	18(0.71)	0	4	18(0.71)	25(0.98)	27(1.06)
D4	DIN PN25/40	165(6.50)	125(4.92)	100(3.94)	61(2.40)	20(0.79)	0	4	18(0.71)	25(0.98)	27(1.06)
D5	DIN PN64	180(7.09)	135(5.31)	100(3.94)	61(2.40)	26(1.02)	0	4	22(0.87)	25(0.98)	27(1.06)

Process flange size: 1 1/2 inch (40 mm)

Code	Flange rating	øD	øC	øg	ød*2	t	f*3*4	Bolt holes		j	k
								No.(n)	Dia.(øh)		
J1	JIS 10K	140(5.51)	105(4.13)	86(3.39)	44(1.73)	16(0.63)	0	4	19(0.75)	27(1.06)	30(1.18)
J2	JIS 20K	140(5.51)	105(4.13)	86(3.39)	44(1.73)	18(0.71)	0	4	19(0.75)	27(1.06)	30(1.18)
J4	JIS 40K	160(6.30)	120(4.72)	86(3.39)	44(1.73)	24(0.94)	0	4	23(0.91)	27(1.06)	30(1.18)
A1	ANSI class 150	127(5.00)	98.4(3.88)	86(3.39)	44(1.73)	17.5(0.69)	1.6(0.06)	4	15.9(0.63)	27(1.06)	30(1.18)
A2	ANSI class 300	155.4(6.12)	114.3(4.50)	86(3.39)	44(1.73)	20.6(0.81)	1.6(0.06)	4	22.4(0.88)	27(1.06)	30(1.18)
A4	ANSI class 600	155.4(6.12)	114.3(4.50)	86(3.39)	44(1.73)	28.8(1.13)	6.4(0.25)	4	22.4(0.88)	27(1.06)	30(1.18)
P1	JPI class 150	127(5.00)	98.6(3.88)	86(3.39)	44(1.73)	17.6(0.69)	1.6(0.06)	4	16(0.63)	27(1.06)	30(1.18)
P2	JPI class 300	155(6.10)	114.3(4.50)	86(3.39)	44(1.73)	20.6(0.81)	1.6(0.06)	4	22(0.87)	27(1.06)	30(1.18)
P4	JPI class 600	155(6.10)	114.3(4.50)	86(3.39)	44(1.73)	28.9(1.14)	6.4(0.25)	4	22(0.87)	27(1.06)	30(1.18)

*1: When wetted parts material code UW (titanium) is selected, value is 34 (1.34.)
*2: Indicates inside diameter of gasket contact surface.
*3: In case where process flange material is JIS S25C, value of f is 0.
*4: In case where process flange material is JIS SUS304 in ANSI/JPI flange, value of f is included in t.

● Terminal Configuration


Communication terminals (BT200 etc.) connection hook
Check meter connection hook*1*2
CHECK + or ALARM +
SUPPLY +
SUPPLY –
CHECK – or ALARM –

● Terminal Wiring

SUPPLY + –	Power supply and output terminal
CHECK + – or ALARM + –	External indicator (ammeter) terminal*1*2 or Status contact output terminal*2 (when /AL is specified)
⏚	Ground terminal

*1: When using an external indicator or check meter, the internal resistance must be 10 Ω or less. A check meter or indicator cannot be connected when /AL option is specified.
*2: Not available for fieldbus communication type.

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< Factory Setting >

Tag Number	As specified in order
Amplifier Damping *2	'2 sec.' or as specified in order
Output Mode	'Linear' unless otherwise specified in order
Calibration Range Lower Range Value	As specified in order
Calibration Range Upper Range Value	As specified in order
Calibration Range Units	Selected from mmH_2O, mmH_2O(68°F), mmAq, mmWG, mmHg, Pa, hPa, kPa, MPa, mbar, bar, gf/cm^2, kgf/cm^2, inH_2O, inH_2O(68°F), inHg, ftH_2O, ftH_2O(68°F) or psi. (Only one unit can be specified)
Display Setting	Designated differential pressure value specified in order. (%, Engineering unit or user scaled value.) Display mode 'Linear' or 'Square root' is also as specified in order.
Static Pressure Display Range*1	'0 to 25MPa' for M and H capsule. Display unit is selectable from the units listed in above 'Calibration Range Units'.

*1: For differential pressure transmitters only.
*2: To specify these items at factory, /CA or /CB option is required.

Revision Information

- Title : EJX118A and EJX438A
  Diaphragm Sealed Differential Pressure and Pressure Transmitters
- Manual No. : IM 01C25H01-01E

Edition	Date	Page	Revised Item	
1st	Oct. 2004	—	New publication	
2nd	Feb. 2005	2-5		• Add 2.9.2 'CSA Certification'.
		2-6	2.9.3	• Delete WARNING on non-incendive power supply.
		8-6, 8-7		• Correct description. Rc 1/4 → R 1/4
		8-10	8.3	• Add codes for CSA approval.
3rd	July 2006	2-3	2.9	• Add note for Fieldbus communication.
		2-3 to 2-9	2.9	• Add/change applicable standards.
		2-6	2.9.2	• Add descriptions for Note 2.
		2-9		• Add "2.9.4 IECEx Certification."
		2-10	2.10	• Change reference number for Australian standard.
		2-11	2.11	• Add descriptions for European Pressure Equipment Directive.
				• Add "2.12 Low Voltage Directive."
		8-1	8.1	• Add *5 in Table 8.1.
		8-3	8.1	• Add descriptions for stainless housing.
		8-4, 8-5	8.2	• Add amplifier housing code 2
		8-10	8.3	• Add code of /SU2.
		8-11	8.3	• Add note for amplifier housing code 2.
		8-12	8.3	• Add description for *5.
4th	Feb. 2008	—		Change of the style code.
		General		• Change the figure of amplifier housing.
		1-1	1	• Add style code table.
		2-1	2.1	• Update the Figure 2.2.
		2-5	2.9.1	• Add code /V1U.
		2-6	2.9.2	• Revise information for CSA Explosionproof type.
		2-7	2.9.2	• Add code /V1U.
		2-8	2.9.3	• Revise information for KEMA flameproof type. Add code /V1U.
		2-9	2.9.3	• Revise Figure in (2) Electrical connection and (6) Nameplate.
		2-10	2.9.4	• Revise information for IECEx flameproof type.
		8-4	8.1	• Revise weight specification.
		8-5, 8-6	8.2	• Add new suffix codes for 316 SST blind plugs and brackets.
		8-11	8.3	• Remove /KF2 and /KU2. Add /KF21, /KU21, /SF2 and /V1U.
		8-12	8.3	• Add /HC.
		8-14	8.4	• Revise external dimensions.
5th	Aug. 2009	2-1	2.1	• Replace a name plate.
		2-6	2.9.2	• Correct certificate No. for CSA explosionproof type.
		2-12	2.10	• Revise standards.
			2.11	• Revise information of PED.
		8-2	8.3	• Add note in Figure 8.1
		8-4	8.1	• Modify descriptions of materials.
		8-7 to 8-10	8.2	• Modify descriptions of materials.
		8-11	8.3	• Add process sealing statement for CSA approval.
		8-12	8.3	• Add /DG6.
6th	Apr. 2010	2-1	2.3	• Add limitation of ambient temperature for /HE.
		2-3 to 2-11	2.9	• Add limitation of ambient temperature for /HE.
		6-2	6.2	• (1) Replace the figure.
		8-4	8.1	• Add material for cover O-rings.
		8-12	8.3	• Add /HE.

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